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USSR Report

MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

NO. 10, October 1984

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Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.

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AIR-FORCE REAR SERVICES CHIEF GIVES PEP TALK

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 1-3

[Article by Col Gen Avn Vasiliy Samsonovich Loginov, Air Forces deputy commander in chief for rear services, chief of rear services: "Living Conditions and Combat Readiness"]

[Text] The military post housing the aviation garrison in which officer Yu. Skabkin serves is noticeable by its nice appearance, exemplary order and cleanliness. Aviation personnel facilities include attractive, comfortable flight personnel, ground personnel, and enlisted personnel mess halls, bachelor officer quarters and barracks, beautifully equipped training classrooms and simulators, athletic facilities, and a club. And this military post is no exception. In recent years old buildings in many Air Forces garrisons have been replaced by decent new standard-design barracks, mess halls, medical care facilities, canteens, PX stores, clubs, libraries, and other facilities, which have improved aviation personnel working and living conditions. Personnel of Air Forces units and subunits are provided with decent clothing and receive a high-calorie diet. Personnel cultural facilities, medical care, and availability of goods in the PX are improving year by year; housing is improving with the addition of buildings with better layout and quality of finish work, offering an improved level of comfort.

Tireless concern for the armed defenders of the homeland and for satisfying their material and everyday needs as well as their cultural interests proceeds from the socioeconomic policy of the Communist Party, a policy the essence of which is expressed by a lofty program goal: "Everything for the sake of man, everything for the good of man!" This concern for the Soviet people is formally articulated in the USSR Constitution.

The April (1984) CPSU Central Committee Plenum was a new and vivid manifestation of the party's constant concern for the good of the people and for strengthening economic and social advance; it gave a new impetus to the nationwide initiative aimed at accomplishing the tasks assigned by the 26th CPSU Congress and subsequent CPSU Central Committee plenums. Organization of military personnel living conditions is being carried out from the position of the party's high demands.

Military living conditions possess specific features in the Air Forces, just as in all other branches of the Armed Forces, since living conditions and off-duty routine are totally subordinated to the task of further strengthening the combat readiness and fighting efficiency of aviation units and subunits. USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo, focused attention at the Armed Forces Conference on Improving Living Conditions in the Military on the fact that securement of a high degree of combat readiness, level of military discipline and personnel self-discipline are directly linked with meeting people's material and living conditions needs. Barracks, mess halls, athletic, cultural, and personal services facilities play a major role in creating mood and attitude in servicemen and in determining their attitude toward job-related duties.

The large, important tasks of the current training year, connected with mastering complex aircraft and adopting efficient modes of combat employment of this hardware, impose ever increasing demands on the entire Air Forces rear services support system, on training and indoctrination of rear services personnel, and on providing living conditions in the military. Implementation of these demands is the cornerstone of the painstaking labor by commanders, political workers, staff officers, party and Komsomol activists of rear services units and subunits, who are doing everything they can to ensure that aviation personnel work persistently to improve their skills in uninterrupted flight operations support in the course of tactical air exercises, airfield rear services exercises, and in daily combat training. As a result the majority of tactical air exercises during the summer period of training were conducted with excellent quality, in a complex, instructive environment which demanded that personnel, including aviation rear services specialists, display high morale and excellent skill, as well as requiring considerable physical exertion.

Take, for example, the separate airfield technical support battalion under the command of Lt Col Yu. Karyakin. During the summer period of training the unit's aviation personnel displayed a high degree of proficiency in rapid setup of subunits and services at another field, readiness to commence support of flight operations on schedule, and good march training. These results were achieved by incorporating advanced know-how into the process of personnel training and indoctrination, effective utilization of socialist competition results, as well as strict observance of regulations in work areas and quarters, organization and discipline.

As we know, flight operations represent a complex and diversified aggregate of actions by all personnel. This fact is well understood by the command authorities, party and Komsomol activists of this battalion, and therefore they display particular concern for providing high-quality meals, prompt, timely and full provision of job-related clothing and specialized gear, as well as organization of aviation personnel off-duty routine and leisure time.

A no less important matter, requiring constant attention by commanders, political agencies, headquarters staffs, party and Komsomol organizations, is development and improvement of unit administration and services. This is fostered to a considerable degree by the review-competition held each year in the line units. In preparing for them, the personnel of aviation units and

subunits do a great deal of work in planting greenery on and sprucing up military posts. Commanders and political workers, party and Komsomol activists are seeking ways further to improve daily living conditions of aviation personnel as well as additional reserve potential in further development of unit administration and services.

For example, subsidiary food-raising operations and greenhouses are a considerable help in improving the quality of diet for flight personnel, engineers and technicians. Vanguard units are already producing each year considerable quantities of farm products in addition to the standard ration. Lt Col A. Lazorenko's men, for example, are providing with their subsidiary farming operation almost 6 months requirements in meat, milk, eggs, and other foodstuffs. It is gratifying that other units are taking an example from the vanguard. Party members of rear services units are well aware of the fact that this is the contribution they can make to implementation of the Food Program, which is helping to increase the welfare of the Soviet people and thus to strengthen the might of our socialist homeland.

We must note, however, that not all Air Forces facilities meet today's demands. Some commanders and people in administration are little concerned with personnel daily living conditions and provision of cultural services. This applies particularly to organization of meals for enlisted personnel and NCOs, and bringing exemplary, orderly procedures in enlisted-personnel mess halls, PX and personal services facilities.

I should like to make particular mention of personnel quarters. A great deal remains to be done in this regard. Unfortunately not every military installation has a complete complement of requisite buildings and facilities, and not all personnel are quartered in decent barracks and dormitories which are well heated and receive plenty of light. Also meriting the most serious attention are matters pertaining to providing housing to officers, warrant officers, and Soviet Armed Forces civilian employees. We know that every year more and more families of military personnel receive nice, well-built, well-appointed apartments with all attendant amenities, but in a number of places difficulties still continue to exist. Apartments are not always assigned on a priority basis to those who are in the greatest need. Living conditions of young officers housed in bachelor officer quarters also sometimes leave much to be desired.

In some places there are also complaints about medical services. Health and sanitation oversight over the condition of the grounds of military installations, meal facilities and water supply is not always up to standards. In connection with this there arises an acute need to beef up health and sanitation oversight in some Air Forces garrisons. Firmness and demandingness should be displayed at all times, as well as effort to correct even the most insignificant deficiencies in providing aviation personnel with adequate living conditions.

In discussing negative phenomena, we should also mention that at times some officer-leaders fail to attach adequate importance to organization of personnel living conditions in field situations. Although such things are rare occurrences, they are sometimes encountered. And of course they should

not be ignored, for it is precisely in field conditions, as we know, that aviation personnel activities involve many additional difficulties. Therefore commanders, political workers, rear services officers, party and Komsomol organizations are called upon to wage a consistent and resolute campaign against these phenomena and to do everything necessary to ensure successful operations by each and every pilot, navigator, engineer, technician, and all aviation personnel.

We are fully capable of correcting mistakes and all kinds of deficiencies if we make common cause and enlist the entire military community in this effort, for military personnel living conditions, people's comfort and convenience are a matter not only for rear services personnel. And it is not only an administrative and supply matter, but first and foremost the business of the party. The slightest deficiencies and errors of omission, not to mention abuses in this area, should be met with the most resolute countermeasures and the sharpest condemnation, first and foremost by party members.

In resolving issues pertaining to off-duty routine and living conditions in Air Forces units and subunits, it is important clearly to see the goal for the sake of which we are doing all this work. Our goal is to ensure a high degree of combat readiness on the part of personnel who are operating, on the ground and in the air, the latest and most modern aircraft systems. And everything which helps achieve this goal must be utilized in full measure.

If we speak today about the close interlinkage between a high level of combat readiness and well-organized aviation personnel off-duty routine and leisure-time activities, we cannot ignore matters of thrifty and economical expenditure of material and financial resources. Today's campaign for economy and thrift demands the closest attention on the part of commanders, political workers, chiefs of services, party and Komsomol activists. As experience attests, deficiencies in this important matter are encountered precisely where leader personnel are not demanding on themselves and their subordinates, where ideological-indoctrination work with personnel is poorly arranged, and where there is a lack of party concern with improving economic activities.

V. I. Lenin's appeal to be scrupulously conscientious in keeping accounts on money, to exercise economical management, to observe the strictest labor discipline and to implement rigorous record keeping and oversight has as relevant a ring today as it did in the past. This comprises the basic content of economic work in Air Forces units and subunits. For this reason our party attaches great importance to the innovation capabilities of units to achieve purposeful, intelligent, economical utilization of material and monetary resources.

It is for good reason that we link matters pertaining to aviation personnel living conditions and leisure-time activities with problems of all-out economy of material and monetary resources. Each and every ruble saved will unquestionably promote improvement in personnel living conditions. Therefore to speak of economy reserve potential means discussing further improvement of living conditions for the winged defenders of the homeland.

The range of activities pertaining to organization of off-duty routine and living conditions in the military is rather broad. These matters are dealt with not only by commanders and superior officers but also by party and Komsomol organizations. They are called upon in this matter to be reliable assistants of commanders, political agencies and headquarters staffs and to make every effort to display that activeness which, as was emphasized at the Armed Forces Conference of Komsomol Organization Secretaries, presumes prompt and timely resolution of relevant matters pertaining to personnel training and indoctrination, strengthening military discipline, and maintaining a high degree of combat readiness. It is the vital concern of party members to pioneer new initiatives in organizing off-duty activities and living conditions in the military. Party organizations are called upon to respond with sensitivity to all new innovations and to support in every possible way beneficial initiative aimed at further improving aviation personnel living conditions, for a distinctive feature of off-duty life in the military is the fact that it is created by the labor of all personnel. This means that one must give all-out support to the handymen and efficiency innovators who help create comfort and pleasant conditions in bachelor officer quarters and barracks, mess halls for flight personnel, technical personnel, and enlisted personnel, canteens, who are transforming the countenance of aviation garrisons and military posts.

Party organizations are also called upon to constantly concern themselves with ensuring that each and every officers' club, enlisted men's club, each and every Lenin Room and library become genuine focal centers of political and cultural indoctrination work, to ensure that at these facilities one can always read the latest issues of newspapers and magazines, watch television, hold evening youth activities, technical quizzes and other mass-political activities.

Organization of meals for personnel at exercises and during performance of training missions out of alternate airfields should become a focus of special concern on the part of aviation rear services party members. This will be promoted by study of the work experience of rear services agencies during the Great Patriotic War and its practical adoption taking into account today's facilities and logistics base.

In providing aviation personnel with all types of clothing and personal gear, one should not forget about maintaining an exemplary external appearance on the part of personnel, for it is no secret that one can judge from men's appearance, neatness and military bearing not only their observance of rules and regulations pertaining to wearing the military uniform but also the overall state of military discipline and organization in aviation units and subunits.

A party-minded approach to further improvement in provision of services, amenities, and decent living conditions for Armed Forces personnel presupposes a planned and orderly nature, a high degree of organization, and persistence in following through on a job from start to finish. "Excessive attention to form with consequent detriment to content, paper shuffling, and a bureaucratic attitude are intolerable in all matters," CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the

USSR Supreme Soviet, emphasized in his speech at the Armed Forces Conference of Komsomol Organization Secretaries. These negative phenomena are especially intolerable in organization of services, amenities, living conditions and leisure-time activities for military personnel. A paramount, important task facing all those involved in providing and supporting aviation personnel combat training proceeds from this: they should consider as their vital concern the matter of comprehensive and full satisfaction of the material, daily-living and cultural needs and interests of the defenders of the homeland, as well as organization of their military labor and off-duty activities. In our conditions to accomplish this task with party firmness means to be genuinely concerned with further strengthening the combat readiness of Air Forces units and subunits and with creating for aviation personnel favorable conditions for them to carry out this patriotic and internationalist duty.

The party Central Committee decree entitled "On the 40th Anniversary of the Victory of the Soviet People in the Great Patriotic War of 1941-1945" expresses confidence that Soviet citizens will rally even more solidly behind the Leninist Party and will mark this truly historic event with additional achievements on all areas of economic and cultural development, and by their self-sacrificing labor will make a worthy contribution toward strengthening the economic and defense might of the socialist homeland.

Inspired by the party's great trust and confidence, the men of the Air Forces rear services units and establishments, having consolidated achieved performances in socialist competition during the current training year, are filled with determination, together with all aviation personnel, fully to achieve the ambitious socialist pledges they have adopted, to accomplish the difficult tasks assigned them, and thus to raise to an even higher level the combat readiness of our glorious Air Forces.

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CAUSES OF POOR PERFORMANCE AT TACTICAL EXERCISE PROBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) p 4

[Article, published under the heading "Be Alert, in a Continuous State of Combat Readiness," by Military Pilot 1st Class Maj A. Gorlenko: "The Tactics... Were Implied"]

[Text] The tactical air exercise commenced when the first rays of the rising sun peeped out from behind the horizon. At the signal to assemble, aviation personnel proceeded to the airfield and began readying the aircraft. Everything was ready at the designated time, and soon the airfield reverberated with the powerful roar of turbines.

Capt V. Roslov's flight was one of the first to take off. The pilots had been assigned the mission to destroy an "aggressor" strongpoint. To accomplish the mission more effectively, it was necessary to execute a complicated maneuver at low level. It seemed that every factor had been taken into account and everything had been thoroughly rehearsed during preparations on the eve of the exercise. Upon reaching the range, however, the pilots failed to turn tight enough and were unable precisely to come onto the target.

Maj Ye. Dzhepa also failed to accomplish the mission. He reached the release point on schedule and pushed the release button. But the bomb failed to release from the pylon. It was ascertained that prior to initiating his bombing run the pilot had failed to arm the weapon release circuit.

Two failures had occurred at the tactical air exercise. What was the reason? After all, a tactical air exercise is not your routine training sortie; the men prepare for it with particular diligence. It was necessary to analyze the matter in detail.

At first glance it would seem that preparations had been thorough. The pilots had worked up their charts, detailed their reference points, and computed their routes. The groundcrews had meticulously readied the aircraft. On the surface it seemed that a businesslike combat-preparation atmosphere was prevailing in the classrooms and on the flight lines. But unfortunately it only seemed that way.

Preparations for this tactical air exercise differed little from ordinary preparations for routine flight operations. In my opinion the reason was that the aviation personnel were failing to set themselves up psychologically for operations in a complex dynamic environment typical of today's combat. An instructive environment was not very frequently created at exercises here. At times some tactical air exercises differed from routine flight operations only in the fact that personnel would come to the airfield in response to the signal to assemble. Then relaxation would set in, and everything would assume the routine operations rhythm. It is quite natural that complacency resulted in mistakes.

But this was not the only reason for the failed performances. In preparing for a tactical flight exercise, proceeding along the path of least resistance, we at times would unwarrantedly simplify the situation and not reduce compromises with realism to a minimum. As a result some flight commanders would not work very thoroughly on elaboration of the mission and would fail to develop their own solutions. Exercise effectiveness would also be diminished due to the men's inadequate knowledge of ground forces tactics.

The failure of Capt V. Roslov's flight is a consequence of the fact that the pilots possessed poor knowledge of the tactical environment. And yet it had changed somewhat by the time they were approaching the target. In addition, the leader was not precisely maintaining timing and heading, which immediately affected maneuver as well. The postmission debriefing also revealed that the pilots had not adequately memorized their chart, had not designated basic reference points and had poor knowledge of telltale signs identifying "aggressor" troops. In short, they proceeded as if routine training flights were involved, and they gave little thought to the tactical environment.

The exercise demonstrated that it was necessary rapidly to alter the combat pilots' attitude toward tactical training.

A great deal has changed since that time.

...Under heavy pressure by motorized riflemen, the "aggressor" had been forced to withdraw to new positions. Receiving an intelligence briefing, the aviators quickly coordinated their actions taking the altered situation into account. When everything had been refined and detailed, the pilots climbed into the cockpits of their combat aircraft. Within a few minutes the group led by Maj N. Kryzhanovskiy departed on its mission.

The leader, knowing that the "aggressor's" air defense assets had been partially neutralized, led his group at extremely low level across an area where there was a gap in the radar coverage. It seemed that it would not be difficult to get through the air defense zone in those conditions. The "aggressor," however, suddenly and unexpectedly initiated heavy jamming. This made execution of the mission considerably more difficult, since communication between aircrews deteriorated. In this situation Major Kryzhanovskiy proceeded to give commands to his wingmen by maneuvering his aircraft. The group reached the target with precision and knocked it out with an accurate strike.

What helped the pilots successfully accomplish the mission in these difficult conditions? During preparation for the tactical air exercise, Maj N. Kryzhanovskiy and his wingmen, Maj N. Tikhonkov and Capts P. Sergeyev and A. Tyaten'kin, had thoroughly studied the tactical situation and were prepared for any and all changes on the battlefield. The well-prepared combat pilots performed aggressively, boldly, and with determination.

One can cite many such examples. Qualitative indices in the aircrews' combat training improved first and foremost because in working up combat missions the pilots began utilizing the device of modeling in order to achieve fuller utilization of the capabilities of the aircraft systems, their armament, control and support facilities. In addition, on the ranges they have been more frequently setting up a target layout maximally simulating actual combat hardware, its disposition and camouflage.

We should also like to note the following. By allowing necessary situation simplification, commanders justified them with a complex air environment. As experience indicated, these were nothing but excuses. Aviators are now authorized to display initiative and independence, with the strictest observance of safety precautions. Every pilot has thoroughly studied and mastered his weapons and is familiar with fragmentation patterns and conditions of combat employment. Each flight commander is personally responsible for the preparation of his men. And until he is convinced that a pilot has thoroughly learned the requirements of the documents governing flight safety, he will not allow him to fly.

Strengthening of party-political work at tactical air exercises has exerted a positive influence on the quality of air proficiency. Now political workers and party activists officers B. Sharoyevskiy, Ye. Vlasyuk, I. Petrakov and others are working more vigorously to mobilize personnel for successful accomplishment of mock combat missions. Party political work is carried out in strict conformity with the assigned missions, which evokes in aviation personnel a precombat emotional surge, the required psychological mood, and an endeavor to surpass the "aggressor" in combat skill and moral staunchness.

The measures carried out in our squadron have had a beneficial effect on combat training. It is a bit premature, however, to state that all deficiencies have been corrected. A great deal remains to be done. The main thing is to work constantly to equip the pilots with firm knowledge and more boldly to incorporate into the training process all new things which have a positive effect on increasing combat readiness. We view this as a guarantee of successful accomplishment of socialist pledges.

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REPORT ON AUGUST KOMSOMOL CENTRAL COMMITTEE RECEPTION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) p 5

[Article, published under the heading "Implementing the Recommendations of the Armed Forces Conference of Komsomol Organization Secretaries," by Maj N. Antonov: "The Younger Generation Takes the Baton (Vanguard Aviators Received at All-Union Komsomol Central Committee)"]

[Text] Several months have passed since the 5th Armed Forces Conference of Komsomol Organization Secretaries. Work is in full swing in Air Forces units and subunits to study thoroughly the proceedings of this military youth forum. The attention of military aviation personnel is focused on the address by CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, which he presented to Komsomol members of the Army and Navy. It reflected the party's deep concern for the younger generation of builders and defenders of communism and for increasing the activeness and businesslike efficiency of Komsomol, which is called upon to perform important and difficult tasks.

How these tasks are being carried out, how the conference recommendations are being implemented, and how young aviation personnel are carrying on the fine traditions of the older generation was the subject of discussion at a reception held in August at the All-Union Komsomol Central Committee. It was attended by military leaders, Air Forces veterans, aviation commanders and political workers, and Komsomol activists. The assembled gathering was addressed by Comrade D. Okhromiy, secretary of the All-Union Komsomol Central Committee. He reminded the audience that more than 50 years have gone by since Lenin Komsomol adopted the resolution to accept patronship over the Air Force. Our fine young people have added many bright pages to the chronicle of Soviet aviation. They have been on the front lines both during years of war and years of peacetime construction. Pilot-heroes A. Pokryshkin, I. Kozhedub, A. Mares'yev, B. Kovzan, and others, who are today known throughout the country, were ushered into aviation by Komsomol.

The young men who have taken their places today under the colors of military units and combined units are by their military labor building upon the traditions of the combat veterans, are improving their combat skills day by day, are devoting their entire energies to further strengthening of the

defense capability of the Soviet homeland, and are honorably carrying out their patriotic and internationalist duty. Half of all Komsomol member aviation personnel are excellent rated in combat and political training, while one third are high proficiency-rating specialists and master-rated.

Today, just as in the 1930's, Comrade D. Okhromiy noted further, Komsomol organizations are concerned with providing worthy military aviation cadres replacements and are doing considerable work in the area of military-patriotic indoctrination of youth. However, the speaker emphasized, we cannot rest on our laurels. Advancing toward an important date -- the 40th anniversary of the Victory of the Soviet people in the Great Patriotic War, we must expand these efforts. We should work with even greater persistence to instill in young people a love of the homeland and hatred toward its enemies, a high degree of political, class vigilance, and constant readiness and willingness to perform exploits. Such a task has been assigned to Komsomol in the military, including the Air Forces Komsomol organizations.

Aviation personnel listened with close attention to an address by Col Gen Avn L. Batekhin, military council member and chief of the Air Forces Political Directorate. Making preparations for the glorious anniversary of our Victory, he stressed, the overwhelming majority of Komsomol organizations of aviation units and subunits have stepped up efforts in all areas. They are giving considerable assistance to commanders and political workers in instilling in young people Communist conviction, pride in their profession, and a strong desire to perform valiant deeds. The revolutionary, fighting, and labor traditions of our people are skillfully utilized in military-patriotic indoctrination of servicemen. Young aviation personnel are taking part in the All-Union "Chronicle of the Great Patriotic War" quest expedition, are actively corresponding with veterans, and are reconstructing the pages of the heroic biography of their units. Contact with heroic deeds inspires youth and engenders in them the desire to continue and build upon the fame of their fathers and to work persistently in studying military affairs.

Air Forces Komsomol organizations have developed many courageous, skilled air warriors who are dedicated to the cause of the people and party and to the socialist homeland, who are playing a vanguard role in a practical manner and who display courage and heroism in the course of daily combat training, in guarding the homeland's airspace, and in giving internationalist assistance to the people of the Democratic Republic of Afghanistan. Many of them have been awarded lofty government decorations. They include officers P. Kruglov, A. Gusarov, A. Prokop'yev, and others. Air Forces Komsomol organizations, noted Col Gen Avn L. Batekhin, must with their entire propaganda activity form in young aviation personnel the endeavor to take an example from vanguard performers, who are making a large contribution toward accomplishing the tasks assigned by the Communist Party to the fighting men of the Soviet Armed Forces.

The military council member and chief of the Air Forces Political Directorate emphasized that party and Komsomol organizations of aviation units and subunits presently have the task of ensuring unwavering implementation of the demands of the CPSU Central Committee decree entitled "On Further Improvement of Party Guidance of Komsomol and Enhancement of its Role in Communist

Indoctrination of Youth" and the instructions by Comrade K. U. Chernenko stated in his address at the 5th Armed Forces Conference of Komsomol Organization Secretaries. Securement of a vanguard role by members of Komsomol in mastering military organizational specialties, in boosting proficiency ratings, in mastering the elements of air proficiency, and in enlisting them in the campaign to reduce the time required to make subunits and units combat-ready should be considered the main focus of their work.

R. Shadzhalilov, A. Gusarov, and others told how the party's demands and the conference recommendations are being implemented. The young aviation personnel were addressed by Pilot-Cosmonaut USSR twice Hero of the Soviet Union Col L. Popov and by famed test pilot Hero of the Soviet Union M. Gallay.

Those present at the reception assured the Komsomol Central Committee and Armed Forces command authorities that young military aviators will at all times be capable of accomplishing those responsible and difficult tasks which the Communist Party assigns to them and will continue in the future making every effort to strengthen the combat readiness of the Armed Forces. For them there is no more important task than reliably to guard the great achievements of socialism.

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PARTY INDOCTRINATION AT VORONEZH ENGINEERING SCHOOL

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 6-7

[Article, published under the heading "A Higher Level of Party Influence at Air Forces Higher Educational Institutions," by Candidate of Philosophical Sciences and Docent Col L. Vyalykh, political section chief, Voronezh Higher Military Aviation Engineering School: "Teach and Indoctrinate"]

[Text] The steady increase in the leadership role of the CPSU in all domains of our country's life and activities, including in ideological indoctrination of the younger generation, is dictated both by internal and external factors and is an objective historical mechanism of the forward movement of our society. "In order to ensure that the Soviet society moves forward with certainty, toward our great goals," stressed CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, in his speech at the April (1981) CPSU Central Committee Plenum, "each new generation should rise to a high level of education and general cultural accomplishment, occupational skills and civic activeness. One might say that this is a principle of social advance."

It is our profound conviction that an important task proceeds from this party demand for Air Forces higher educational institutions. It was also directly addressed in an article by Col Gen Avn L. Batekhin, chief of the Air Forces Political Directorate and military council member, entitled "A Higher Level of Party Influence at Air Forces Higher Educational Institutions," which appeared in the March 1984 issue of this journal. It is a task of ensuring a comprehensive, unwavering increase in the responsibility of military teaching cadres for the effectiveness of the entire teaching and indoctrination process, effectiveness and success of party-political work conducted with future officers.

Our school produces officers with a military specialized higher education. But they are not merely military specialists; they are first and foremost indoctrinators of subordinates, ideologically conditioned defenders of the homeland. This is why matters pertaining to improving the quality of the moral-political and job-related training of future officers and further improvement of the entire training and indoctrination process constitute the principal concern of the school administration, political section, and

faculty. Practical experience confirms that there should be no more important or responsible task for the military educator than that of working persistently and day by day, jointly with commanders and political workers, party and Komsomol activists, to form in the future Air Forces officer first and foremost excellent moral-aesthetic and party-minded qualities, the qualities of a warrior, who is ideologically conditioned, who thinks innovatively, who is persistent in working toward achieving a goal, and who has the ability to lead others. The task of indoctrinating such an officer-specialist is no easy one. It demands a strong sense of responsibility on the part of each and every instructor for the common cause as well as his particular involvement in this cause.

Take, for example, the school's department of Marxism-Leninism, headed by Candidate of Historical Sciences Col A. Trifonov. The party members in this department are characterized by innovative quest, initiative, and highly-active volunteer work. Study groups in this department, such as the "Young Internationalist Lecturer Club," which is led by experienced military educator V. Sorokin, the "Prometheus" literary society, established by Candidate of Historical Sciences Lt Col A. Abasov, the "Young Philosopher's Club," in which Maj V. Yakovlev, graduate of the Military Political Academy imeni V. I. Lenin, works actively, plus others are widely known beyond the school's confines.

V. I. Lenin stressed that the teaching process cannot be divorced from the process of indoctrination. This important principle is further embodied in the CPSU Central Committee decree entitled "On the Principal Directions of the General-Curriculum and Vocational School Reform" and in the proceedings of the 5th Armed Forces Conference of Komsomol Organization Secretaries. We are endeavoring unwaveringly to implement all these demands. It is very important that students be convinced of the necessity to work and study, that they understand the social significance of their study and be aware of the interlinkage between their activities and the practical business of building socialism and the necessity of defending its achievements. From this follows the important conclusion that the indoctrinational influence of the military educator is particularly distinctly manifested when he himself embodies in the eyes of his students those vanguard ideas and lofty demands which he conveys to them. Candidates of philosophical sciences officers V. Koval'chuk, A. Trifonov, V. Kuz'menko, and others at our school have proven themselves to be precisely such educators.

Lt Col N. Didenko has been teaching for many years at this school. He successfully applies vanguard teaching methods in his classes, which make it possible to bring the teaching process closer to actual conditions of line unit life and activities. For example, here is how the instructor employs the games modeling method for student independent study in the student group he leads. Nikolay Danilovich has the stronger students play the role of commanders, who are responsible for the conduct and progress of the weaker students and give them specific assistance. Regularly held instructive classes with the "commanders" on teaching methods and the fundamentals of military psychology and education science, which have injected a spirit of competitiveness into these activities, have fostered greater student activeness, which has had an immediate influence on their classroom performance.

The training group, which previously had been in eighth place in academic performance, has moved forward and recently took third place in the subunit on the basis of socialist competition results. Cadets A. Rybin, A. Kustovinov and others are grateful to their comrades cadets A. Dyuzhev and V. Yegorov, who acted as commanders. Approximately 30 percent of the cadets in the training group received primary commander experience and learned to shape interpersonal relations and be responsible for an assigned work area in just a single session, as a result of adoption of the game modeling method.

Or take another example. The lectures, discussions, and presentations by Candidate of Technical Sciences and Docent Col V. Fertikov are always distinguished by a high degree of party-mindedness, military directional thrust, sharpness of focus and precise sequence of presentation. This officer skillfully utilizes technical teaching devices. When listening to Valeriy Dmitriyevich, one cannot help but recall the words of great Russian scientist D. I. Mendeleyev: a teacher's entire pride lies in his pupils, in germination of the seeds he has sown.

The CPSU Central Committee and USSR Council of Ministers decree entitled "On Further Development of the Higher School and Improving the Quality of Specialist Training" notes the importance of enhancing the role of the department as the main component of the higher educational institution, which determines the content and unity of the curricular, scientific, and indoctrinational process. Our school's departmental staffs headed by officers A. Trifonov, N. Pichkalev, V. Mozikov, and N. Didenko skillfully combine teaching and political indoctrination work with measures by the school administration and work by party and Komsomol activists of the faculties and courses of study. Faculty members carefully study the professional and moral-political qualities of the cadets and help them organize socialist competition. Discussion of training and indoctrination tasks at combined department and curriculum party meetings, holding of joint conferences, and instructing Komsomol activists directly in the subunits have proven effective. Such work forms bring the departments closer to the courses of study and help secure practical unity of personnel training and indoctrination.

The Communists of these and other departments are constantly looking for and finding effective forms of indoctrinational effect on students. Military-patriotic indoctrination is intelligently structured, for example, in the course of study of specialized subjects. As an illustration, Col I. Drabo, senior instructor in military history, has adopted the practice of inviting participants in the events of the terrible war years to his classes on history of the Great Patriotic War. And there are more than 50 such veterans at the school. Recently, while preparing his students for a seminar, Igor' Alekseyevich invited to a preparation session Hero of the Soviet Union Col (Ret) M. Martusenko. Mikhail Stefanovich talked about the Battle of the Dnieper, in which he had taken part. He illustrated his presentation with a graphic map-diagram. The subsequent seminar class was conducted in a lively and interesting fashion and the students solidly assimilated the seminar topic.

There is no need to state that participation by war veterans in the training and indoctrination process helps cadets not only more thoroughly assimilate the curricular material but also develops in them strong patriotic feelings, class hatred toward the enemies of the homeland, and confidence in victory.

But unfortunately a different situation also sometimes is noted. When examining the state of affairs in one of the departments, the people in the political section drew attention to the fact that the department faculty members extremely rarely visit the subunits, while some even expressed doubt about the need to do so and displayed a frank disinclination to engage in indoctrination work with the students. In all fairness we should note that the faculty party committee promptly and incisively articulated for discussion the question of participation by the department's officers in indoctrination work with students. The Communists had harsh words for the department head, CPSU member V. Skomorokhov, for the poor indoctrination work within the department, pointed out his personal errors of omission and shortcomings, and leveled critical comments at other Communists in the department as well. Just criticism was also once leveled at Communist-officers V. Semeykin, A. Malyar, and N. Shadrin, of another subunit, for poor work with individual students in the course of the semester.

The examined problems of ideological-political and professional indoctrination of cadets and other enrolled personnel, as well as matters pertaining to indoctrination work among the indoctrinators themselves are closely linked with the activities of the school's political workers, party and Komsomol activists. We are grateful to officer-political workers V. Duda, G. Bobylev, V. Gusev, V. Petrov and V. Adashchik for their contribution toward the forming of a high degree of party-mindedness in aviation personnel, particularly members of the faculty. A large group of party and Komsomol activists, without whom success would be inconceivable, are working shoulder to shoulder with them. For example, good things are said about party members N. Chernyshov, A. Shigrev, M. Kovalenko, A. Tertyshno, A. Apevalov, V. Klintsev, A. Timoshenko, and many others.

In conclusion we should like to stress that the high degree of responsibility on the part of the military educator and any leader-Communist for indoctrination of future officers is a measuring stick of his personal qualities and an indicator of his ideological-political preparedness for indoctrination work and conformity with the growing demands of practical realities.

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EFFECTIVE POLITICAL INSTRUCTION TECHNIQUES REVIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 8-9

[Article, published under the heading "From Party-Political Work Experience," by Col I. Ivanov: "And Separately With Each Individual"]

[Text] More than 2 years ago Capt V. Cheklakov was placed in charge of a political instruction group. We talked with him at the time. There were many questions: how to conduct classes, how to organize student independent study, and how to combine flying activities with propaganda work. We particularly remember Cheklakov's reply to the question of what qualities in his opinion a volunteer propagandist should possess.

"In my opinion," he said, "a political instruction group leader should first and foremost be well-prepared at the ideological-theoretical level. And of course he must also have an innovative approach to things, initiative, as well as such a quality as kindness."

He is right. The propagandist will be able to perform his noble function only if he learns to treat students with the proper pedagogic tact and attention, and if he is aware of the moral consequences of his own mistakes, even if they are insignificant. The fact is that it sometimes happens that an instructor seeks to justify his callousness or even rudeness by claiming the need to "display a high degree of demandingness."

It was forcefully reemphasized at the June (1983) CPSU Central Committee Plenum that party demands on workers of the ideological front are steadily increasing as regards their moral purity and exemplariness, their ideological-indoctrinational activeness, and their beneficial influence on the moral/ethical atmosphere in the group. Captain V. Cheklakov has proved to be precisely such a Communist. He had a clear understanding of his duties. And they were extensive. Lectures, seminars, presentation-discussions, assistance to students in preparing reports and research papers....

It is no secret that the rhythm of flight activities in an aviation unit is not always uniform. Frequently squadrons fly different flight operations shifts. And there are also days when, let us say, a lecture is scheduled in the unit, while at the same time the men of one of the squadrons are sleeping

following night flight operations and are unable to attend. Or, let us say, a supplementary topic must be studied. As we see, the 26th CPSU Congress instructions pertaining to a differentiated approach to things, and work "taking into account the specific features of different toiler groups," also directly apply to conditions in the military. Initiative and innovativeness in conducting classes are demanded of propagandists. Officer V. Cheklakov's performance is edifying in this regard as well.

His lectures and talks are permeated with a high degree of party-mindedness and engender ardent patriotic sentiments in the hearts of military aviators. The secret of the propagandist's success lies first and foremost in thorough and comprehensive preparation. Cheklakov prepares detailed lecture notes or an elaborate outline for each classroom presentation. He carefully thinks through the main topic items, clearly determines their order and sequence of presentation, notes what facts, examples and figures should be used to back up individual topic points, and formulates main conclusions. In the course of a presentation, Captain Cheklakov asks the men questions. At the end of a class session he presents explanations on the most complex problems, presents brief summaries, and acquaints students with the procedure of independent study recommended on a literature topic.

Party member Cheklakov does not limit his propaganda activities to classroom hours. He frequently gives talks to aviation personnel during off-duty hours. And he does this at the behest of his heart. Realizing the importance and relevance of questions which arise with students in the area of international relations and our country's domestic affairs, this officer gives clear, specific answers to them. The squadron's ground maintenance specialists were quite pleased with talks he presented during mass-political work hours on the following topics: "Victory in the air is ensured by firm military discipline," and "On ideological brainwashing of NATO bloc soldiers." They helped increase the aviation personnel's ideological breadth.

I believe it would also be useful to discuss how Cheklakov works with individuals. He can often be seen among ground maintenance personnel during flight operations and on days of immediate preparations for equipment maintenance days. The officer asks the men what they liked in a film they have seen or book they have read, what news they hear from home, how preparation of a report or research paper is proceeding, and he will recommend an interesting article in a newspaper or magazine to read for a seminar. Valeriy Ivanovich will not pass by an individual if he notices that the latter is sad or upset.

Advice by older party comrades helps him correctly combine the job of propagandist and pilot. Cheklakov learned a great deal from flight commander Military Pilot 1st Class Capt A. Perevyshko, squadron party organization secretary. He also obtained many valuable tips for holding political instruction classes from officer A. Chasnyk, whose advanced know-how is being successfully implemented and is producing fruitful results.

As we know, the principle of awareness and activeness by the students themselves is one of the fundamental principles in learning. Captain Cheklakov considers it his duty not only correctly and thoroughly to reveal to

the men the content of each topic, but also to develop in them habits and skills of independent study. How does he achieve this?

Just before independent study, each time the propagandist, together with the assistant group leader, carefully reasons through the independent study outline, matters dealing with providing the group with literature, visual aids, requisite writing materials, and also distributes the time rationally and efficiently.

"It would seem to be a simple matter," says Valeriy Ivanovich. "But it is not. The success of each class depends on a number of factors: on the complexity of the topic, availability of requisite literature and instructional materials, and quality of the lecture. New techniques must be sought each time...."

Some members of the group have had a secondary or secondary technical education. They include individuals of seven different ethnic affiliations. Almost all are Komsomol members. The men's level of preparation varies, however. For example, assistant group leader Pfc N. Golovatyy, a high proficiency-rating specialist, is distinguished by a high degree of learning. Pvt V. Rybin is a knowledgeable, hard-working and inquiring individual. Pvt B. Kochubey likes to read and constantly displays interest in political literature. This also applies to others. But this cannot be said, for example, of Pvt P. Ishiliv. He shows little concern for increasing his political knowledge. And Pvt A. Kes commits disciplinary infractions. The group leader continuously bears this in mind. He structures his work in a differentiated and purposeful manner. In some he instills a liking for reading political literature, others he teaches to work with primary sources, while still others he helps master the Russian language....

Here is how independent preparation for a class on the topic "Lenin Komsomol -- a reliable aide and fighting reserve of the Communist Party" was conducted in the group. First the instructor specified the purpose of the class, ran through the principal topic items of the forthcoming seminar, and noted those which should be given particular attention. He then advised them sequentially to specify in their notes the principal items of the topic, to copy from the instructional materials quotations, figures, and the most interesting facts, and recommended that they make use of the CPSU Central Committee decree entitled "On Further Improvement of Ideological and Political Indoctrination Work" and the proceedings of the CPSU Central Committee Plenums and the 5th Armed Forces Conference of Komsomol Organization Secretaries.

Officer Cheklakov recommended that Pvts B. Kochubey and A. Kes study together: Kochubey is more well-read, does a good job of taking outline notes from primary sources, and is excellent-rated in combat and political training, while Kes lacks skills in working with books and is guilty of departures from the demands of military regulations. The propagandist paired others up according to the same principle. He instructed Pvt V. Rybin, who had recently been home on a short leave, to tell his comrades about those great changes which had taken place in his home region. As was specified in the outline plan, the propagandist kept an eye on lagging personnel. In particular, he constantly monitored the work of Pvt S. Latun and S. Utshaliyev. Nor did he

ignore the other men. Pfc E. Dambergo worked with them on the group leader's instructions.

Valeriy Ivanovich dictated to the men excerpts from V. I. Lenin's "Tasks of the Unions of Youth," after which everybody listened to a record of Vladimir Il'ich's speech "What Is Soviet Power?" On Cheklakov's recommendation aviation personnel devoted a good deal of attention to study of those sections from the proceedings of the 26th CPSU Congress which deal with Komsomol, as well as the documents of subsequent plenums and CPSU Central Committee decrees, and speeches by CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet. The group leader was able to influence all the men as a group and each individual, to create a productive, businesslike atmosphere at the classes. Two class hours were conducted with maximum benefit. At the conclusion the propagandist summarized results and gave recommendations on further study of the topic.

Meriting support is a such a form of ideological influence on personnel as practical assignments connected with political instruction class topics. It is actively utilized by Capt V. Cheklakov. It essentially consists in the instructor assigning the best-prepared enlisted men and NCOs presentation of a talk in the flights and servicing groups on current events issues. Or, let us say, he might instruct them to select from appropriate sources requisite comparative figures and facts for subsequent utilization in political instruction classes. Pvt A. Shamsutdinov, for example, presented a talk to his comrades entitled "Focal Areas of International Tension." This Komsomol member skillfully utilized a political map of the world to provide a convincing graphic display. Pvt A. Subbotin collected a good selection of illustrations from newspapers and magazines about the American way of life and arranged them in a display entitled "Behind the Facade of the 'Free World'." He gave a presentation for aviation personnel with this material, and the selection of pictures was subsequently utilized in political instruction classes.

Returning to that earlier conversation with officer Cheklakov, one can state that this party member has remained faithful to his word. His ideological conviction, firmness and frankness, and high degree of competence have earned him the respect of aviation personnel. The men in his group work hard, with a full effort. Working with all of them together and with each individual, Cheklakov endeavors to achieve a constant improvement in the men's ideological level. The knowledge obtained at political instruction classes in turn becomes the men's convictions and a guide to practical actions. All the men in the group carry out combat training tasks with a strong feeling of responsibility and display a personal example in increasing the squadron's vigilance and combat readiness.

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CHURCH'S IDEOLOGICAL ASSAULT ON SOVIET UNION 'EXPOSED'

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 10-11

[Article, published under the heading "At the Fronts of the Ideological Struggle," by Candidate of Historical Sciences and Docent G. Mishurovskiy: "The Church on a 'Crusade'"]

> [Text] The 26th CPSU Congress, the June (1983) and April (1984) CPSU Central Committee plenums defined important features of the ideological struggle in present-day conditions. First and foremost they noted a sharp aggravation of the struggle between the two societal systems and opposing ideologies. Another feature is a shift by the U.S. and NATO forces of imperialism to massive psychological assaults and to a new "crusade" against the USSR and the other nations of the socialist community.
>
> In the subversive anticommunist struggle militant bourgeois ideologists are mobilizing everything which they believe can help defend the ideological position of capitalism. In recent years their sophisticated attacks have become particularly intensified, waged under the banner of religion, the church, and clerical anticommunism, against socialism and for men's minds. That is the subject of the following article.

Religion has long served the political interests of the exploiter classes, turning man aside from reality to mysticism, from a struggle for a better life to illusory happiness in "paradise." In the capitalist countries, where religion has preserved and maintained its position, especially in the United States and in countries which are U.S. NATO allies, religion-colored anticommunist propaganda is being aggressively waged, and there is in evidence an endeavor to cultivate hostility toward atheism with the aid of this propaganda, taking concealment behind the name of God, to discriminate against people who hold atheist convictions. In the United States, for example, statements or actions against religion are punishable in 16 states by a fine of 1,000 dollars or imprisonment for a term of up to 3 years.

In the capitalist world great importance is attached to religious brainwashing of military personnel. In the U.S. Air Force, for example, it is directed by

military chaplains ["military priests"], who are a component part of the military propaganda edifice and who, just like all chaplains, are fully supported financially by the state. At the same time U.S. Air Force chaplains not only keep an eye on military personnel, spotting dissidents and the politically unreliable, but also brainwash personnel in a spirit of anti-Sovietism.

Anti-Sovietism occupies a paramount position in the reactionary activities of the church. The aggressive forces of imperialism establish various "religious studies" centers and subversive organizations under the guise of religion, for the purpose of disseminating religious ideology among the people of our country, combating Marxist-Leninist teaching, and falsification of the policy of the Communist Party and Soviet State. Many such organizations and centers, which work in close cooperation with the intelligence services, have been established in the United States. They exist in all NATO and other countries of the non-socialist world. They number 25 in Western Europe alone. All of them are directly aligned with the military-industrial complex, fully support the militarist policy of the Reagan Administration, and are taking active part in its "crusade" to change the societal system of the socialist countries.

A large role in subversive activities is assigned to the Catholic Church, which maintains an extensive network of organizations. Via Vatican Radio, with broadcasts in 10 languages of peoples of the USSR, and through the literature it publishes Catholicism is endeavoring to combat atheism and genuine socialism, foisting phony ideas about communism on religious believers and nonbelievers alike. During the period of counterrevolutionary events in Poland, for example, the most reactionary wing of the Catholic clergy collaborated with antisocialist elements, adventurists, and opponents of friendship between the Polish People's Republic and the USSR, who were being openly supported by the United States and the NATO countries.

The Uniate (Greek Catholic) Church, which was established in the western territories of the Ukraine back in the 16th century, takes an extremely hostile position toward the Soviet Union as a whole and the Soviet Ukraine in particular. The Uniate clergy in the West, having joined forces with the Organization of Ukrainian Nationalists (OUN) and the so-called "Anti-Bolshevik Bloc of Peoples" (ABN), indefatigably screams about a "Soviet military threat" and recommends that the Reagan Administration build up its nuclear potential, strengthen NATO military forces, cease all talks with the socialist countries, and initiate an "aggressive policy of liberation" at the earliest possible date.

Recently Protestantism has considerably stepped up its activities against the socialist countries. Its propaganda committees seek to propagate anti-Soviet, anticommunist ideas garbed in religious vestments, depending on the audience to which the propaganda is directed, including nonbelievers. Typical in this regard are the activities of a Protestant corporation under the name of Brooklyn Jehovah's Witnesses Center in the United States, notorious for its anticommunism. Its members compel believers to refuse to fight for the important interests of their people and force on coreligionists residing outside the United States Washington's myths "about godless communism," transmit subversive literature, directives and instructions to them through

illegal channels, and set up legal and illegal organizations in various countries.

The Brooklyn Center is also endeavoring to establish Jehovah's Witnesses organizations in our country as well. Their aim is to instill in the rank-and-file religious believers the idea of refusing to participate in holiday demonstrations and rallies in defense of peace, in elections to Soviets of People's Deputies, and refusing to serve in the USSR Armed Forces. The absolute majority of Soviet citizens, however, not only refuse to accept such "ideas" but also nip in the bud the activities of the disseminators of these notions.

In recent years there has been an appreciable increase in social and political activity by Islam (Islam means "submission" in Arabic). Imperialist ideologists and Western politicians have begun assigning an increasingly important role and devoting closer attention to the so-called "Islamic factor." The present U.S. Administration, together with the conservative segment of Islamic leaders, is attempting to create on an anti-Soviet, antisocialist foundation a united ideological-political front of Muslim nations against the Soviet Union.

Falsifiers abroad and Muslim reactionaries are screaming about "persecution for religious faith" and "infringement of the rights" of followers of Islam in the USSR as well as hostility by socialism toward the spiritual affairs and culture of the Muslim peoples.

Such fabrications have nothing in common with the historical truth and constitute a component part of the anti-Communist warfare against the USSR and the other nations of the socialist community. These phony lies are refuted by numerous facts pertaining to development of the Soviet Central Asian republics. Socialism has brought a new life to their people and has opened up extensive opportunities for development of their economy, education and culture. In Uzbekistan, for example, on the eve of the Great October Socialist Revolution only 2-3 percent of the population could read and write. Today there are more than 40 institutions of higher learning in that republic, with a combined enrollment of more than 230,000; the press, television, radio, national culture, dramaturgy and music have experienced extensive development. The Constitution of the Uzbek SSR guarantees citizens freedom of conscience and religion. Like reforms have been instituted in all the other Central Asian republics. Bourgeois ideologists refuse to acknowledge all this, but the peoples of the Central Asian republics clearly see and clearly understand what they have been given and are being given by their Soviet Government.

The Judaic religion, the dogmatic tenets of which constitute a foundation in substantiation of Zionism, is extensively utilized in the clericalist ideological and political campaign against socialism. Clericalist-Zionists have incorporated into their slanderous propaganda against the USSR fabrications about eradication of Jewish ethnic culture in the Soviet Union, which they claim is grounded on the Judaic religion.

Such assertions by clericalist-Zionists are profoundly flawed and permeated with a spirit of chauvinism, nationalism, and anti-Sovietism. The "Jewish

question," that is, an unequal status of Jews, does not exist in the Soviet Union. It was emphasized at the 26th CPSU Congress that our party has fought and always will fight resolutely against such phenomena which are alien to the nature of socialism as chauvinism, nationalism, and against any and all nationalist deviations, be they anti-Semitism or Zionism. The ethnic worth and dignity of every individual is respected in our country. In bourgeois countries, however, the Jewish masses are subjected to anti-Semitic persecution, which frequently takes on the form of outright pogroms.

Acts of ideological sabotage and subversive actions by international imperialism against the socialist countries, reinforced by dishonest juggling of various church teachings and "sacred scriptures," do their "part" toward kindling an anti-Communist, anti-Soviet hysteria in the West. All this dictates that Soviet citizens, army and navy personnel, including military aviation personnel, must display political vigilance, firmly resist the onslaught of the class enemy, and wage an implacable ideological struggle against religious prejudices in people's consciousness.

In the Soviet Armed Forces, just as throughout our country, considerable attention is devoted to atheist indoctrination. Certain positive experience in this matter has been amassed in Air Forces units and subunits. Particular importance is attached to Marxist-Leninist training of officers, political training of warrant officers, and political instruction classes for enlisted personnel and NCOs. It is precisely here that a scientific-materialist ideological outlook is formed and shaped in military aviation personnel. They more acutely comprehend the importance of combating religion today. Other forms are also actively utilized in atheist indoctrination of Air Forces personnel: lectures, reports, Lenin readings, talks, specific-topic evenings, film lecture series, dissemination of the heroic traditions of the CPSU, the Soviet people and their Armed Forces, extensive adoption of new Soviet ceremonies and military rituals into the daily lives of military personnel and the members of their families, etc.

Atheist indoctrination of aviation personnel is being conducted innovatively, with interesting utilization of numerous and diversified forms in the units in which political workers officers S. Il'in, G. Kuznetsov, V. Gmir, and S. Andreychik serve. The complex and multifaceted process of affirmation of atheism and overcoming religious carryovers on the part of certain young military personnel requires on the one hand strengthening of the unity and interlinkage of all aspects of Communist indoctrination, and on the other hand improvement in the content, means, forms and methods of atheist indoctrination proper.

The practical experience of development of the Soviet society confirms the idea presented by K. Marx that religion will disappear in the degree to which socialism evolves. The report by Comrade K. U. Chernenko at the June (1983) CPSU Central Committee Plenum and the decree adopted on the basis of this report advanced the task of devoting more attention to atheist indoctrination, to more extensively involve religious believers in this country's societal affairs, and to work more persistently to incorporate Soviet rituals and

ceremonies. All these demands also apply in full measure to scientific-atheistic indoctrination work conducted among Air Forces personnel.

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SOVIET MILITARY AVIATORS FLY MISSIONS IN AFGHANISTAN

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[Article, published under the heading "From an Afghan Notebook," by Col Yu. Protasov, Kabul-Moscow: "Internationalist Duty"]

[Text] This spring the toilers of the Democratic Republic of Afghanistan celebrated the 6th anniversary of the April Revolution, which put an end to the despotic rule by feudal lords and the bourgeoisie, who had exploited the people for centuries, dooming them to poverty, deprivation of rights, and ignorance. The revolution opened up for the Afghans a road to culture, progress, and to new relations grounded on equality and brotherhood.

A process of democratization of economic and societal affairs is presently in progress in this republic. Things have improved for blue-collar and white-collar workers, and they are earning more. Trade unions, youth and women's organizations have been established in that country, social insurance has been introduced, and workers are participating in enterprise management. An agrarian reform is being carried out -- approximately 300,000 landless and land-poor peasants have received land. Equality between men and women has become law.

Prior to the April Revolution the overwhelming majority of the population could neither read nor write. Today schools are being established for children and courses to eliminate illiteracy for adults, not only in Afghanistan's large cities but even in remote kishlaks [villages]. There is a shortage of teachers, however. Graduates of these very courses, and sometimes Pioneers as well, are becoming teachers. It is not uncommon for a son to teach his father and mother to read and write. Today one of the slogans of the Afghans is "You who are literate, teach the illiterate!" Today's Afghanistan could be called a republic of students. Today all roads are open to the toilers.

This also applies in full measure to the military. The Afghan armed forces are an army of a new type, which was created thanks to the efforts of the PDPA [People's Democratic Party of Afghanistan] and the assistance of a true ally and friend of the Afghan people -- the Soviet Union -- and which is defending the revolution and the people's rule born by the revolution. Service in the

armed forces and every possible aid and assistance to them constitute the honorable duty of each and every Afghan patriot. The armed forces are a school not only of purely military training but also of general education, political and internationalist indoctrination.

"Naturally I, the son of an asphalt plant worker, prior to the revolution could not obtain an education or become an officer," stated Captain Muhamed Nazir. "My brother Khavani is also an officer -- a junior lieutenant. Two other brothers are going to school."

Captain Muhamed Ivaz is from a peasant family. He is fighting valiantly for the cause of the revolution, for which his brother, Lt Col Gulyam Jelani, died. Thousands and thousands of people like officers Nazir and Ivaz are defending the ideals of the revolution and the rule of the workers and peasants, who are building a new life.

The party and government of the young republic display great concern for the toilers. Enterprises are being reequipped, and working conditions are improving. Dial telephone exchanges and an electric power network are being built, and the airport is being renovated. Multistory apartment buildings are being erected for workers and peasants. The Kabul Building Construction Combine has completed thousands of modern apartment units for occupancy. But needs are growing, and the combine had to go through a second birth -- renovation, after which its production capacity doubled. These facts harbor the beginnings of profound socioeconomic transformations in the life of this ancient country.

If imperialist circles had not forced an undeclared war on Afghanistan, the people's accomplishments would have been much greater. The war began immediately after the revolution, in April 1978. Counterrevolutionary bands already then began receiving arms of U.S., British, and Chinese manufacture. Desperate efforts by reactionaries, instigated from without, acts of sabotage and terrorism, and attacks by armed bands formed abroad, operating under the phony slogan of defense of Islam -- all this is diverting the toilers from productive activity. They are forced to take weapon in hand and defend the revolutionary achievements.

The accomplishments of the revolution excite anger and hatred on the part of the bandits. Hospitals, schools, and meal facilities are frequently targets of attack. Sometimes the bandits succeed in perpetrating acts of sabotage and murder. Six persons were injured, for example, in a landmine explosion at a secondary-teaching technical school. Several dozen totally innocent persons were killed in one village. But regardless of whatever atrocities the Basmachi [term refers to armed resistance movement fighting Soviet rule in Central Asia, largely in the 1920's] perpetrate and no matter how infuriated their patrons become from the failure of the ventures they have undertaken, the revolution is alive and growing.

"We want no other path. We shall build a new life. And nobody shall turn us from this path," stated Fatteh Muhamed, a peasant from Herat Province, commander of a detachment of defenders of the revolution. "We have been helped and are being helped in this by a great friend -- the Soviet Union."

Yes, Soviet-Afghan friendship has a glorious history. It began with the founder of the Soviet State, V. I. Lenin, and fighters to restore Afghanistan's independence. Hailing the signing of a Treaty of Friendship in 1921, Vladimir Il'ich dispatched the following message to Kabul: "The old imperialist Russia has disappeared forever, and a new Soviet Russia is now the neighbor of the Great Afghan State, extending a hand of friendship and brotherhood to all the peoples of the East, and particularly to the Afghan people.... We are pleased to note that the first treaty of friendship entered into by the Afghan people is a treaty with Russia.

"We are confident that our sincerest desire will be met and that Russia will remain forever the best friend of the Great Afghan State, to the benefit of both peoples."

The Soviet Union was the first nation to give Afghanistan economic aid. As early as 1921 the Soviet Government gave Afghanistan an outright grant of 1 million rubles in gold, made a gift of several aircraft and 5,000 rifles, placed at the disposal of the Afghan Government technical and other specialists, who directed construction of the Kushka-Herat-Kandahar-Kabul telegraph line, and helped train Afghan pilots. In order fully to appreciate this noble gesture, we should recall that the Soviet land itself was in difficult straits and had need of literally every ruble and every rifle.

Cooperation between the two countries has greatly expanded today. Tens of thousands of Afghans are employed at facilities built with the aid of the Soviet Union. One of the most important of these is the Jangalak Automotive Overhaul Plant in Kabul, which not only overhauls motor vehicles but also manufactures a diversified product line for agriculture, industry, and the general consumer.

Our country is the first nation to give this neighbor effective assistance in prospecting for natural gas, oil, and other mineral resources. Prior to this there had been almost no investigation of Afghanistan's natural resources and they had been virtually unutilized, with the exception of small deposits of lazurite, gold, silver, rock salt, and coal. In Kabul there are files containing reports and conclusions by Western experts who had visited this country. All of them stubbornly insisted that there were no commercially-exploitable mineral resources in Afghanistan. For example, geological missions sent from highly-developed capitalist countries sought to convince the Afghan authorities that it was useless to continue prospecting for copper. One of these missions totaled 70 persons and spent 10 years in Afghanistan.

Soviet experts had a different attitude. Today, with their assistance, the first geological map of Afghanistan in the country's history has been produced. Deposits of coal, iron ore, gold, sulfur, copper and lead ores, mica, tin, mercury, oil, and other minerals have been discovered or surveyed.

Our specialists as well, members of the limited Soviet force, including pilots, groundcrew technicians, and junior-grade aircraft maintenance specialists, are also selflessly carrying out their internationalist duty. Many fine deeds have been accomplished by the aviation personnel of the

squadron under the command of Military Pilot 1st Class Maj A. Shabanov. They fly the most diversified missions, flying the most diversified routes.

Everybody in Afghanistan is familiar with the name of Military Pilot 1st Class Capt S. Gubantsev. His helicopter once flew provisions to a remote mountain kishlak. The kishlak had been visited shortly before that by bandits, who had seized all food supplies, dooming the villagers to starvation. Upon receiving bread, an old Afghan said: "Now my family is saved. I shall never forget the Russian pilot for what he has done for us."

Soon the helicopter was headed back to its base. It was flying along a gorge, along the floor of which a road twisted back and forth. Suddenly the pilot spotted an armored personnel carrier down below. It had not been there on the flight out. The helicopter descended. Gubantsev made out four persons lying on the ground next to the vehicle. Who were they? Afghan soldiers? Could they be in need of assistance? But what if there was an ambush waiting? "In any case I've got to help them," the officer decided.

Gubantsev put the helicopter down next to the vehicle with a jeweler's precision. Our aviators ran over to the persons lying on the ground and heard the moans of wounded. The crew of the Afghan armored personnel carrier, which had detonated a bandit-planted landmine, was flown to the hospital.

Nor will Captain Gubantsev forget a flight into Paktia Province. He and his wingman, Capt L. Derendyayev, had orders to assist Afghan comrades. Major Shabanov warned them: "It's a difficult mission."

"I understand. I bring her down within the fort, and Derendyayev will assist me," replied Gubantsev.

And the Soviet pilots flew patriots out of the fort, regardless of the danger and difficulties involved.

You never cease admiring the courage and skill of our aviators and the way they carry out combat training missions and help Afghan military personnel, villagers and townspeople. Military Pilot-Expert Marksman officer L. Pavlov related: "Our pilots, engineers, technicians, and junior-grade aircraft maintenance specialists display examples of flawless military labor. And our work here is not easy. Take the flying of missions. It is very difficult to get one's bearings in the mountains, and there are still too few ground electronic navigation aids. We sometimes use an abbreviated configuration for takeoff and departure climbout and landing approach descent. Naturally all this makes flying more difficult. Good flying proficiency and solid knowledge of theory are essential. One must be thoroughly familiar with terminal areas, conditions and peculiarities of flight operations. This was brought home to me personally. Once I received orders to deliver supplies for the people of Kunduz. I proceeded to fly to that town. I reached the point where according to my calculations the airfield should be located, but I could not find it. It was rapidly growing dark, and in addition there was heavy dust in the air in the destination area. I could see nothing! Nevertheless I landed safely, thanks to the fact that I was quite familiar with the local landmarks."

I became acquainted with Lt Col K. Mostovoy at an airfield. After a flight we struck up a conversation. Konstantin Grigor'yevich said little about himself. He talked more about his fellow soldiers Majs V. Glagol'yev and V. Smirnov, Capts V. Yeremin, I. Gayyazutdinov, and A. Skryabin -- genuine flying experts and true internationalists.

"And our navigators?" marveled Konstantin Grigor'yevich. "They really help the pilots! It is really amazing when you learn, for example, how precisely Military Navigator-Expert Marksman officer Mikhail Ziklenkov guides his aircraft to the destination in bad weather. He has been awarded the Order of the Red Star for skilled performance of flight missions. CPSU member Military Pilot 1st Class Capt Anatoliy Fadeyev and Komsomol member Military Navigator 2nd Class Lt Aleksandr Kazak are equally skilled. Their fellow soldiers are proud of them."

Konstantin Grigor'yevich had flattering things to say about many outstanding aviators. And his comrades told me about him. Lieutenant Colonel Mostovoy is the son of a pilot, a veteran of the Great Patriotic War. Grigoriy Afanas'yevich Mostovoy flew a heavy bomber against the fascists. He was wounded, but he kept flying. He worked for many years in agricultural aviation. Once he took his 10-year-old son along on a Po-2. That was when Konstantin first developed the desire to become a pilot. To date he has logged hundreds of hours in the most difficult weather conditions. His An-12 has been everywhere, and this pilot has flown all kinds of missions here in Afghanistan! He generously shares his experience and know-how with the younger men.

The groundcrew personnel, who do a prompt and high-quality job of readying aircraft to fly, also work selflessly. Sr Lts Ye. Lysokon' and S. Boyko always service their combat aircraft with a strong guarantee of reliability. The men of the technical maintenance unit under the command of Sr Lt S. Anikushin are also working hard.

I listened to officers Mostovoy, Pavlov, Shabanov, and Gubantsev, and I thought about how fully and brilliantly are being revealed the outstanding traits of Soviet citizens who are carrying out their internationalist duty far from their homeland and how selflessly they are helping the friendly Afghan people build a new life!

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NIGHT FOUL-WEATHER ASW SEARCH SWEEP DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) p 14

[Article, published under the heading "Visiting Our Comrades in Arms," by Capt 3rd Rank S. Turchenko: "Night Search"]

[Text] The aviators considered the mission a comparatively simple one: to locate an "aggressor" submarine within a designated area. Complications began before they had even left the ground, however. The weather took a sharp turn for the worse shortly before departure. And the search group included two young aircraft commanders who had not yet been cleared for night flying in instrument weather. One had to be replaced, and an experienced instructor went up with the other.

Thus the detachment which took off on the mission was of a somewhat unusual makeup. The group was headed by one of the unit's top pilots, Military Pilot-Expert Marksman Lt Col I. Masliy. Military Pilot 1st Class Maj V. Kolotukhin, from a detachment which for several years now has been in competition with Masliy's subunit, flew wingmen. As fate would have it these competition rivals were teamed up in common harness, as they say. Military pilot 1st Class Maj V. Votintsev was leader of the other two-aircraft element, and his wingman was young aircraft commander Capt V. Kochuba, who was flying his first night instrument-weather search mission. He was well prepared, however. And sitting in the copilot's seat was experienced instructor Col Vladimir Vasil'yevich Kochuba, the young pilot's father.

The aircraft flew above cloud cover to the search area. At the computed point the navigator reported distance to destination area. The aircraft commander commenced descent and asked over the intercom for radar-indicated local weather status. "Some areas of precip showing. Icing in clouds."

"Switch on anti-icing system." "System on. Electrical discharges in clouds!"

"I can see them. Pretty, but... unpleasant."

Bluish "snakes" wriggled across the cockpit glass as if alive, and from time to time a resounding cracking sound was heard, as if somebody out there beyond the cockpit was violently snapping dry branches.

Following Lieutenant Colonel Masliy's orders, his wingman continued flying above the cloud cover, while the leader scouted out the weather above the sea surface. It would determine how they handled the search.

The aircraft commander was not flying such a mission for the first time. He possessed considerable experience, having logged thousands of hours. And the very title military pilot-expert marksman means that the combat pilot has in his arsenal a number of well-practiced and proven techniques for accomplishing the assigned mission. The group also contained other, equally well-trained pilots -- acknowledged aerial ace Kochuba senior and Kolotukhin, the experience and know-how of whom Masliy could call upon at any time.

The situation in the search area presented a difficult tactical problem, and they would have to resolve it through joint efforts.

The weather reconnaissance aircraft's report came over the radio: "Attention aircrews: cloud cover 80 percent, cloud tops 1250, bases 400. Visibility 6. Heavy seas. Prepare to drop buoy."

We should note that with heavy seas conducting a submarine search is not easy. But the commander had a solution for this situation as well, for an ASW aircraft carries various means of detecting an "aggressor." One of them was entirely suitable in the prevailing situation, particularly since the sub had to be detected, by whatever means available.

Another search was proceeding in parallel -- for a more optimal solution. And it was found after the very first sweep run. The group commander approved the decision to conduct a combined search, in which several tactical devices would be employed simultaneously. This experiment was devised right on the spot, and its authors were members of three generations of aviators, including socialist competition rivals. This meant that the technique, which had only just been devised, was guaranteed widespread dissemination.

A night search is not very eventful. There is not a great deal to tell about it. Hour upon hour of monotony. Continuous tension. And one must not lessen one's vigilance for a single moment, responding instantly and with precision to the slightest changes in the instrument readings.

The magnetic tape showed a "biological silence." And the infrequent exclamations, reports, and instructions were akin to the red markings on a sounding line.

The copilot, Lt Sergey Ivanov, wants to do the flying at every opportunity.

"Can I take over the controls, skipper?" he asked.

"You want me to give up such a fun job?"

Dawn was about to break: a crimson glow appeared in the east.

"But you are tired...."

"Can one get tired from such a fascinating activity?"

But Masliy did hand over the controls to Ivanov, while he himself closely monitored the gauges.

The magnetic tape bore meters of silence. The navigator's voice came on the intercom: "We're getting some strong returns from clouds up ahead. We've got to get some altitude."

"We'll have time. First we'll put down a buoy."

"We've got to climb right now."

"Roger...."

Military Navigator 1st Class Maj Yu. Tenzin is a man of integrity and flawless efficiency. An instructor qualified in all categories of combat training, day and night, he has logged about 3,000 hours and has never committed a single violation of flight regulations under any circumstances. In addition, he has kept pilots with whom he has flown from violating regulations. Quality is very important to this navigator.

The buoy was dropped.

"What number?" the pilot queried.

"...teen."

"Say again?"

"...teen."

"Can you say that more clearly?"

"What meter?"

"Not meter, more clearly."

"Switch meter on!"

This rather bizarre exchange was with navigator-operator Lt V. Krasnobryzhev. He was in his first year, and did his best, but sometimes had problems. In this instance there was a good reason for his "hearing defect." The young officer had failed promptly to record down the buoy number, but did not want to admit it. He was stalling so that he could correct his mistake. But you can't hide anything from this pilot!

...A few hours later the aircrews were back at the field. The search had been successful: they had detected 2 submarines, contact with which the pilots had handed over to a surface ASW attack group. The overall result of the mission was increased flying and tactical skills for the aviators concerned.

And when the exercise performance results were announced, the socialist competition rivals ended up on the same step of the symbolic pedestal of honor, as did father and son.

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BOMBERS FLY DUSK BOMBING, CANNONFIRE TRAINING SORTIES

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) p 15

[Article, published under the heading "Marching in the Vanguard," by Lt Col M. Chevychelov: "At Ground Targets"]

[Text] The day was sunny and calm, but quite recently gale winds had been raging in the area.

"You never know what the weather has in store here," remarked one of the aviators who had assembled by the tower waiting for flight operations to commence.

"We're right next to the ocean. That's the reason for the unexpected surprises," somebody replied. "The weather forecasters are once again promising gale-force winds tonight...."

Subunit deputy commander for political affairs Lt Col S. Talyzin, hearing this conversation, could sense the officers' anxious concern. The aviators' concern was quite understandable. The most proficient crews would be flying today. And if they successfully accomplished all scheduled training activities, during subsequent training flights experienced combat pilots would teach the techniques they had mastered to their subordinates -- recent graduates of pilot school, for whom everything here was new: the airfield, the taiga, the ocean, and even the aircraft -- fast, formidable bombers....

The weather reconnaissance pilot had returned. He entered the classroom where all the subunit's aviators were already assembled. The duty meteorologist had prepared on the board synoptic maps with steeply curving isobar lines and was waiting for the pilot's report. The regimental commander was also waiting for the weather update: according to the schedule flight operations were supposed to commence in daylight, in VFR weather, while toward night, if the weather deteriorated, the crews would proceed to fly training sorties in IFR weather.

The weather reconnaissance pilot reported current weather conditions in the range area. His report dispelled the last doubts: flight operations would proceed in accordance with the specified schedule. The aviators checked their

watches. The commanding officer gave final instructions, and soon the first combat aircraft took off.

...The sun's orange disk was dipping toward the horizon as Lt Col S. Talyzin's bomber approached the range. Foam-frothed wave crests rose on the heaving dark-blue sea swells below. A strong wind was blowing. "We are still quite some distance from the target. We will be bombing almost at dusk," the pilot commented. "And with a crosswind.... It too must be taken into account."

Sergey Anatol'yevich is one of the subunit's most proficient pilots, with a 1st-class rating. But he does not take the easy way out; he thoroughly prepares for every flight. The previous day he and his comrades had pledged to receive nothing but high marks for the bombing and delivery of cannon fire on ground targets on this training sortie. And now the wind had suddenly picked up.... Naturally this would make the task more difficult to accomplish. But he had to do his best, for the others would measure their performance against his, as a political worker.

"This is 82, on approach. Altitude....," Lieutenant Colonel Talyzin informed the ground a quarter of an hour later.

"82 cleared to target, one aircraft on second pass," came the reply.

The squadron commander's crew was first to execute the exercise. A black puff of smoke appeared left of the target, and the wind immediately began drifting it further to the left. "The squadron commander was a little off. We'll make an error correction," Sergey Anatol'yevich said to himself. He made the correction in his calculations and immediately designated the aiming point.

"On bombing run, target in sight," he reported.

"Cleared to bomb target," the range officer replied.

Fourth turn.... Talyzin put the aircraft on its wing and went into a dive. The luminous aiming mark began to slip toward the designated reference point. The pilot brought the aircraft back out of the bank. His entire attention was now focused on the ground.

An attack is over quickly. Finger on the release button. One second, another, and... a bomb heads for the target.

As Lieutenant Colonel Talyzin was pulling away he spotted the smoke puff below. It was positioned somewhat to the right of the target. On his second run the pilot made the necessary correction. This time he put the dark-orange burst right in the center of the target.

The sun had dropped behind the coniform hills. Dusk was thickening down below. The target would soon be engulfed in darkness. But they still had to fly an attack pass with cannon fire. They would have to somehow adjust to the twilight. Talyzin switched the weapon controls and pushed the reload button. Panel lights flashed on: weapons ready!

"This is 82, on target run...."

"82 cleared to attack target," the range officer responded.

The ground once again was swiftly approaching. The pilot pushed the firing button in an accustomed motion, and the cannons immediately proceeded to rumble. Heavy streams of tracer peppered the target.

"That does it!" Talyzin said to himself as he turned the aircraft to a homeward heading. On the next sortie he would take up a young pilot and demonstrate to him the mastered technique.

...The last bomber had returned from the mission and was back on the flight line. A red flare pierced the sky. The airfield fell silent. Flight operations had come to an end. The training sorties had been productive. Everything the experienced combat pilots had learned today would soon be passed on to their subordinates, the young pilots.

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PILOT FLIES MOCK COMBAT PHOTORECONNAISSANCE MISSION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) p 19

[Article, published under the heading "For a High Degree of Combat Readiness," by Maj V. Shestachenko: "Beyond the 'Battle Line'"]

[Text] Groves, light-blue patches of lakes, rectangular fields, and the gray ribbons of highways and dirt roads swept past under the aircraft's wing. Dozens of kilometers lay behind. Capt A. Strelkov closely scrutinized the terrain. So far the flight was proceeding as planned.

Upon being assigned a reconnaissance mission, Strelkov had thoroughly studied on the map the target area, had marked off his route, designated waypoint landmarks, and calculated all phases down to the minute.

The sweeping bend of a river sparkled up ahead. The aircraft was approaching the "battle line." Motorized rifle subunits, which had arrived in an assembly area during the previous night, were concentrated somewhere down below. They were to redeploy undetected and be prepared to penetrate an "aggressor" defense which had been prepared in advance. In order successfully to accomplish this mission it was essential to obtain current and detailed intelligence on the location of "aggressor" weapons, field fortifications, and dispositions to the entire depth of his defenses. What kind of armored reserves did he have available? What were their possible routes of movement? Aerial photoreconnaissance could provide a sufficiently complete and accurate answer to these questions.

Military Pilot 1st Class Capt A. Strelkov knew that this was no simple matter. It requires of an air reconnaissance pilot maximum composure, alertness, equanimity, profound knowledge, and the ability to appraise the tactical environment and the character of the "aggressor's" actions. In addition, at an exercise, just as in war, every sortie involves the danger of encountering fighters while airborne. Nor are ground air defense weapons napping. Even after a pilot has succeeded in deceiving the "aggressor" and, skillfully maneuvering, has photographed the objective, he must be constantly alert, be able to evade pursuit, and to deliver the gathered intelligence to the command authorities at all costs. The reconnaissance pilot worked himself precisely into this frame of mind before departing on the mission.

Captain Strelkov proceeded to descend. He crossed the "battle line" at low level. From this moment on he would be combating the "aggressor" -- his ground detection radar stations and tactical air defense system. During this time another pilot, Capt A. Bondarenko, was executing diversionary maneuvers, frequently altering heading, airspeed, and altitude.

The reconnaissance pilot kept his aircraft "on the deck," as they say. Now his job was more difficult: the distance at which he could visually detect ground objects had shrunk, as had the time during which he could observe them. It was also no longer possible to look at the map. Success depended primarily on the pilot's proficiency, preparedness, and memory, as he had memorized the principal terrain features from the map before he had taken off on the mission.

The officer realized that the "aggressor" would definitely camouflage and conceal his tanks. It would be difficult to spot them. But it was highly unlikely that he could conceal the tracks left by the vehicles' track links. And the pilot in fact succeeded in pinpointing the tank column on the basis of these indirect signs. He switched on the aircraft's cameras. After executing another maneuver, Captain Strelkov's attention was drawn to a suspicious dark patch which stood out against the background of withered grass. And he immediately determined on the basis of characteristic signs that this was an "aggressor" missile launcher position. A steep turn -- and the aircraft swiftly attacked. Fire! Fountains of dirt were thrown into the air where the target stood.

The pilot set a heading for home. The main thing now was to get out of the zone of potential encounter with "aggressor" aircraft as quickly and as inconspicuously as possible and as quickly as possible to deliver the valuable intelligence to headquarters, where they were waiting impatiently.

The aircraft taxied up to the fueling station. The film cartridges were removed from the cameras. Maj A. Shikida and Capt M. Goncharov -- experienced specialists -- immediately proceeded to process the aerial photographs and to prepare position plots. They studied in detail the detected objects and installations on the aerial photographs, appraising the pattern of their disposition and siting, and hastened to turn over the processed intelligence without delay to the ground troops command authorities.

Military Pilot 1st Class Capt Aleksandr Strelkov, son of a combat veteran, contributed to the successful advance by motorized riflemen in one of the sectors of the "front."

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ADVANCES IN INDUSTRIAL ROBOTICS REVIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 20-21

[Article, published under the heading "Milestones of the 11th Five-Year Plan," by Maj V. Dolgishev: "Robots on the March: Report From the Exhibit of Achievements of the National Economy of the USSR"]

> [Text] "On the foundation of utilization of scientific and technological advances: boost production and secure extensive employment of automatic manipulators (industrial robots), built-in automatic control systems utilizing microprocessors and microcomputers, design and build automated shops and plants...."
>
> From the Basic Directions of Economic and Social Development of the USSR in the Period 1981-1985 and Up to 1990.

They already can do a great deal: weld metals, assemble articles, cut steel sheets, and stamp machine parts. The next areas of employment will be exploration of space and the ocean depths, servicing of nuclear reactors, harvesting fruits and berries, caring for farm animals, plus many other jobs where man's capabilities are limited or where it is more advantageous for him to find a replacement so that he can work on other, more important, creative things.

We are talking about industrial robots -- harbingers of a new scientific and technological revolution. Their design and development, manufacture and extensive adoption have today become one of the most important directional areas in automation of production processes. The CPSU Central Committee decree entitled "On Measures to Increase Production and Extensive Utilization of Automatic Manipulators in the Branches and Sectors of the Economy in Light of the Instructions of the 25th CPSU Congress," which was issued in 1980, and the decisions of the 26th CPSU Congress and subsequent CPSU Central Committee Plenums emphasize that the extensive employment of industrial robots or automatic manipulators will radically alter the situation in the area of labor productivity, will boost the equipment utilization factor, will raise the overall level of production sophistication, and will make it possible to free hundreds of thousands of workers from physically taxing and grindingly

monotonous operations. All this in the final analysis will help overcome the differences between mental and physical labor.

Industrial robots are not only opening up prospects for the development of fundamentally new industrial processes where, from designing and planning production to manufacture of finished product, man will not touch a tool, and where man will be replaced in jobs where labor involves health hazard or is of a monotonous nature (particularly in mass-production operations). Manipulators never "get tired," do not "make mistakes," do not need vacations, are not halted by total darkness or high temperatures, air pollution or elevated radiation levels. Their needs include prompt and timely preventive maintenance and provision with work to perform.

Some industrial robots not only possess "vision," "understand" speech, and move around obstacles, but also respond to the slightest changes in temperature, pressure, and humidity, and to radioactivity. This once again confirms that robotization does not boil down to simple replacement of human muscle power by industrial mechanisms. We are dealing with a qualitatively new step in the automation of industrial production.

There is a broad area of practical application of robots in the exploration of space and the planets of the Solar System. Specialists calculate that at present there are 25-30 unmanned missions for every manned mission. The space robot Lunokhod-1 worked on the moon for 10 and a half months, traveling a distance of 10.5 kilometers on its 8-wheeled chassis. It took soil specimens, analyzed them, and transmitted the data to Earth. Our next robot emissary, Lunokhod-2, controlled from the Long-Range Space Communications Center just like its predecessor, traveled 37 kilometers in a period of 4 months and transmitted more than 80,000 television images, 86 panoramic shots of the lunar surface, plus a great deal of other extremely valuable information. The magnetic readings, for example, taken by the space robot made it possible to obtain data on the internal structure of the moon to a depth in the order of several hundred kilometers.

In the first 3 years of the current five-year plan our industry built experimental models and initial series of robots to operate metal-cutting machine tools, presses and injection molding machines, as well as for spot and arc welding and painting. Such industrial robots as the Tsiklon-3B, Universal-50M, Sprut, Sever-1, the PMR-0.5-254K minirobot, and others on display at the exhibit are equal in specifications and performance to the finest foreign-made models.

The scale of design and manufacture of automatic manipulators in this country is steadily growing. A total of 120 were built in 1975, more than 1,500 in 1980, and 10,700 in 1983. Last year, with a 4 percent overall growth in industrial output volume, the manufacture of industrial robots rose by 96 percent. The robot inventory will reach 50,000 units by the end of the five-year plan. Subsequently the rate of growth will rise even more rapidly. By 1990 production of manipulators in the USSR will increase eightfold. Unquestionably substantial qualitative changes will also take place.

This is why the display entitled "Industrial Robots and Robotized Industrial Systems" at our country's principal exhibit is so popular. The numerous visitors are fascinated to learn about our country's accomplishments in the field of robot engineering and how the latest designs are being put to practical use. Approximately 100 new exhibits are on display in the four exhibition halls, including seven robotized manufacturing complexes, with information provided on each, telling of their contribution to our nation's economy.

One of our scientific research institutes is demonstrating a robot designed to automate manufacturing processes in the machine building industry. The load lifting capacity of one of its "hands" is 5 kilograms, with great precision of manipulation. Annual savings from its adoption runs from 5,000 to 12,000 rubles. This robot is now in regular production.

Also of interest is the PMR-0.5-254K industrial minirobot, which is designed to automate manufacturing operations in the instrument engineering industry, in particular in the assembly, testing, package-assembling, and packing of goods. It consists of several modules. Each of these is an independently functioning unit and is equipped with compressed-air drive and controllable pneumatic valves with electric drive.

In the future, employment of such systems will make it possible to establish totally automated computer-controlled sections, which will provide capability to boost labor productivity by a factor of 3-4 at such work stations. Approximately 60,000 mechanized lines were installed in the 10th Five-Year Plan, for example, and 25,000 sections, shops, and production operations were totally mechanized and automated. This has made it possible to free more than 2 million persons from manual operations. This is why the pace of furnishing industrial enterprises with modern machines, automatic control and means of mechanization has been substantially accelerated in the current five-year plan.

Considerable interest on the part of visitors to the exhibit was aroused by a robotized manufacturing section developed at the Taganrog Industrial Design Institute for Press Forging Robot Engineering (manufacturer: Salsk Press Forging Equipment Plant). It is designed for two-pass cold-sheet pressworking of machine parts such as cover plates, flanges, and other shapes from flat workpieces. Section operation in automatic mode, the convenience and safety of control from consoles positioned beyond a safety barrier, and the existence of sensors which monitor the operating conditions of the presses, industrial robot and the entire section as a whole enable a single operator to handle two sections, thus replacing the labor of four press operators.

Timely, relevant, useful -- this is perhaps the most accurate description of what we saw at the exhibit. The innovative developments of the engineering design people displayed at the exhibit possess an additional important quality -- efficiency. Of course the road from production associations and shops to the nation's principal exhibit and back to plants and factories, enterprises and sovkhozes is not so short. But robots have already taken their first steps. They number in the tens of thousands today. And tomorrow hundreds of thousands of automatic manipulators will take their work stations for five-

year plan labor watch and will take their rightful place among the labor force, to serve man faithfully.

We should like to address one more general matter, the "interrelationship" between robot and man which inevitably arises with the adoption of automatic manipulators. There is a noteworthy fact: in Japan, where more than 10,000 robots are presently in operation, workers at many plants, as paradoxical as it might seem, are manhandling enormous cast-iron workpieces, their bodies glistening with sweat, and are performing other unskilled, strenuous and hazardous jobs. What does this indicate? It indicates that robotization of production in the capitalist countries is dictated not by concern for man but by mercenary calculation, for a robot does not demand higher wages or better working conditions, it does not go on strike or take part in political rallies.... The steel arms of robots are depriving tens of thousands of workers of job opportunities. Official figures alone state that the number of "surplus" persons in Japan has increased by approximately 500,000 in the last 5 years and today totals approximately 1.7 million, not including millions of partially-unemployed.

Military circles in capitalist countries are displaying particular professional interest in robotics. "Weapons without man" -- this is the essence of their new misanthropic idea. This involves utilization of pilotless aircraft to perform various missions, particularly the conduct of photographic, TV, radio and radar reconnaissance, jamming the operation of electronic devices, as well as development and testing of remote-controlled submersibles, vehicles and so-called "military robots" for ground forces. The present U.S. Administration has recently made the decision to militarize space. According to its schemes, space robots which are "armed to the teeth" will hold a sword of Damocles over the head of all those who refuse to accept a U.S. dictate and U.S. hegemony on a world scale.

Two worlds -- two goals: humane, and inhuman. Herein lies the essence of the question of "interrelations" between robot and man. Only in the conditions of a socialist society does scientific and technological advance bring people good, peace and prosperity. And this is determined by people, not robots. This is also part of the message told by the displays in the Industrial Robots and Robotized Manufacturing Systems exhibit in the Machine Building Pavilion at the Exhibit of Achievements of the USSR National Economy.

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AVIONICS MAINTENANCE OFFICER PROFILED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 21-22

[Article, published under the heading "Marching in the Vanguard," by Maj S. Tolstoy: "Selflessness"]

[Text] The flight operations shift was almost over. Aircraft were shooting instrument landing approaches in the bad weather, one after the other. Soon they would be involved in a tactical air exercise, flying various mock combat missions, and unit personnel were working intensively in preparation for this critical test.

Suddenly a veteran pilot came on the radio, informing the tower that he had doubts about the readings of one of his navigation instruments. A difficult situation had developed. Everything ended safely, however, thanks to skilled actions by the pilot and the ATC team.

"This aircraft is supposed to take part in the exercise," the unit commanding officer instructed his deputy for aviation engineer service, "and therefore assign your most experienced maintenance people to correct the malfunction. Who are you going to put in charge?"

"Guards Major Gushchin," the officer replied.

The commanding officer approved this decision, and some time later the team of maintenance specialists, led by radio communications and navigation equipment engineer Gds Maj A. Gushchin, set to work.

The problem proved to be much more complicated than had been assumed. Following a lengthy and painstaking effort to locate the problem with the aid of test instruments, it was established that the performance characteristics of one of the nav units failed to show normal technical parameters. The result was absence of the proper signal at the output of one of the antennas. What was the problem?

Aleksandr Vasil'yevich carefully listened to the maintenance specialists' opinions. They all were inclined toward the same conclusion: since time was limited and the aircraft had to be returned to the line, they should replace

certain units and components. No big deal! Gushchin, however, thought differently. It is not in this officer's character to stop halfway, to retreat without having utilized all possibilities of finding a solution to the problem. And his Communist's conscience also told him it was wrong to remove from an aircraft expensive equipment which had not used up its useful life, for it represented a considerable monetary investment.

"We shall look for the cause of the malfunction," Aleksandr Vasil'yevich firmly stated.

And he returned to his calculations. The others followed his example.

Time passed, dusk fell over the airport, but there was no end to the work in sight. The maintenance specialists were now working with flashlights and lamps. Each individual came to the unfailing conclusion that operations within his area of responsibility were being performed correctly and meeting specifications. This resulted in a paradox: all units were operating normally when taken individually, but together they were working incorrectly due to insufficient signal output.

Aleksandr Vasil'yevich checked his men's progress, helped them, and gave advice. He made his own contribution. He took part in operating the navigation equipment and carefully analyzed the instrument readings, comparing the various technical parameters and numerical values with the diagrams and drawings, and performing complex calculations. In short the engineer proceeded along his own path, just as he had been taught at the Kiev Higher Military Aviation Engineering School: from the simple to the complex, from the general to the particular. And the experience he had acquired in the unit served as a beacon for further steps, as it were. Over the course of the years this engineer had formulated an inalterable working principle or, more precisely, a personal logical scheme of troubleshooting: objective testing and monitoring plus external indication of a defect.

And in the final analysis this produced results. Ultimately all variations fell by the wayside, leaving only one -- his own. Aleksandr Vasil'yevich joyfully realized that the puzzle was close to solution. He had finally found the reason for the signal abnormality at the system output. When Gushchin shared his reasoning with his comrades, the latter were amazed: everything turned out to be not so complicated after all....

I remember that when this outfit was proceeding to transition over to a new aircraft, the following point appeared in their socialist pledges: work persistently to learn to use the aircraft and its weapons effectively, work under the slogan "A higher level of mastery of the new equipment." Gushchin considers execution of this point of pledges, just as others, to be his vital concern, a vital necessity. Therefore at one of the party meetings at the beginning of the training year he called upon his fellow soldiers thoroughly to study the aircraft and all its systems, and to serve in a practical manner as an example for the men in carrying out their professional duty. We should note that Aleksandr Vasil'yevich kept his word. Soon thereafter, while engaged in efficiency innovation work, he equipped a specialized vehicle for performing routine maintenance procedures on aircraft avionics, as well as for

performing aircraft equipment repairs in field conditions. To date he has many other implemented proposals to his credit as well.

It is not surprising that the team headed by Guards Major Gushchin is one of the top ones in the unit. An atmosphere of innovation, mutual understanding, strong self-discipline and comradely mutual assistance prevails. The deputy commander for aviation engineer service said the following, for example, about Gushchin and his men: "Aleksandr Vasil'yevich is a very obliging and helpful individual, who is greatly concerned not only for his own work area but first and foremost for overall flight operations support. He solves problems in a profound and well thought-out manner, and he is bold in his solutions. He also teaches this to his men. They do not shrink from performing a large volume of work, and they make maximum use of test equipment. Hence their excellent results in combat training."

Indeed, that which the radio communications and navigation equipment service has achieved to date is not the result of a single brief campaign. A high degree of return on effort and solid results in working on aircraft equipment are ensured by many factors, but chiefly by style of leadership. Guards Major Gushchin performs on his team the function of a unique power generator, who charges up the others with his own energy and initiative, instilling in them a feeling of responsibility for performance of their job-related duties.

Responsibility. As we know, this is a moral and ethical, a paramount concept. Today it is particularly essential to a specialist in any profession, and doubly so for a military aviation engineer, since he is servicing and maintaining aircraft. Practical experience confirms that a sense of responsibility does not come automatically. It must be developed by all forms of party-political work and job-related training, and it must be instilled daily, persistently, purposefully. Discussing this important aspect of his commander activities, Aleksandr Vasil'yevich reasons: "Take theoretical training, for example. In particular, one of its forms -- individual problem assignments to the maintenance specialists. What is the most important thing here in developing in people a feeling of responsibility? Verification! Verification of preparation of lecture outline notes, verification of mastery of a subject, etc. In addition, we follow the practice of mandatory presentations by aviation personnel to their comrades at scheduled commander training classes or in technical study group classes dealing with various systems of an aircraft which is new to them...."

As a leader-Communist Aleksandr Vasil'yevich is especially firm in matters of selection and placement of personnel. The following example typifies this. One of the technical maintenance unit groups was once headed by an officer from whom one unquestionably could learn things. In short, he was master proficiency-rated. But he had practically no organizing ability, to be quite frank. Naturally his outfit suffered, and there occurred violations of military discipline, and subsequently preconditions for air mishaps through the fault of personnel. It was necessary to take extreme measures. And Guards Major Gushchin was the first to raise the question of the place and role of the leader-Communist.

Now this technical maintenance unit group is headed by Gds Capt N. Pogrebnoy. What has changed in the past year? The group has become excellent-rated, and an outright majority of the aviation personnel have mastered related occupational specialties and become excellent-rated in combat and political training. Military discipline in the outfit has become stronger. And all this is thanks to a skillful combined approach in indoctrination, efficient distribution of task assignments in conformity with the level of knowledge of each maintenance specialist and the degree of complexity of the work involved, good organization of scheduled training and, of course, a serious, thoughtful attitude by the team leader toward work with individuals. This entire work is now directed primarily toward instilling in aircraft maintenance specialists professional honor and a strong feeling of responsibility for the assigned job.

There is another feature characteristic of party member Gushchin: a constant focus on innovative search. It is manifested most graphically in daily routine activities at the airfield where, strictly speaking, there is a campaign in progress to achieve high quality of readying aircraft for flight operations. Once Aleksandr Vasil'yevich conducted an inspection of the quality of operations performed by maintenance specialists of the avionics group during preflighting procedures. A subsequent detailed analysis indicated that a strict system was lacking in the sequence of performance of preflighting procedures. The reason for this was the lack of a uniform system of methods. An idea came to Gushchin at this point. Together with group chief Gds Sr Lt V. Shvetsov, he devised and developed a process routing chart for performance of these procedures. It produced tangible results: the time required to turn each aircraft around for the next training sortie was substantially reduced. In addition, the quality of ensuring navigation system accuracy characteristics substantially improved. Now such inspections are performed monthly.

I spoke with Aleksandr Vasil'yevich. I wanted to learn more about this interesting individual. The men in his unit say that Gushchin not only knows his job but is a thoughtful maintenance specialist, an active volunteer worker and Communist with integrity, but also a sociable individual who has the ability to fire people's enthusiasm and lead them. I learned that Aleksandr Vasil'yevich is a good singer and plays musical instruments in a competent manner.

I asked him to tell me something about himself. Reluctantly at first, but warming up as we got to talking, Aleksandr Vasil'yevich told me about his difficult childhood, his youth, and his dreams of aviation. "I come from an aviation family," he stated with pride, becoming more animated. "My father, Vasiliy Petrovich, was a fighter pilot throughout the war, shooting down several enemy aircraft. My father's brother and sister were also aviators...."

As I was departing from the aviation garrison, the thought suddenly came to me that it was precisely such selfless individuals as Guards Major Gushchin, dedicated to their profession, who today comprise the foundation, the most valuable assets of our glorious Air Forces. Aware of their constitutional duty to the people and their responsibility to defend the people's

achievements, by their daily military labor they are further building upon the fighting traditions of the aviators of the older generation and are making their own contribution toward strengthening the might of the socialist homeland.

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EAST-BLOC COOPERATIVE SPACE PROGRAM DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 27-28

[Article, published under the heading "Peaceful Orbits Above the Planet," by V. Yegorov: "For the Good of Mankind"; first part of a two-part article]

[Text] In its space exploration program the Soviet Union is guided by the interests of science, of strengthening friendly relations between nations, and by the endeavor to place the practical accomplishments of the space program at the disposal of all mankind as rapidly as possible. Faithfulness to these principles has been demonstrated throughout the more than 25 years of space exploration.

At the initiative of Soviet scientists, representatives of nine countries -- Bulgaria, Hungary, the GDR, the Republic of Cuba, Mongolia, Poland, Romania, the USSR, and Czechoslovakia -- adopted a program in Moscow in April 1967, calling for joint research in the area of space physics, space meteorology, space communications, space biology and medicine (and also in the area of remote earth sensing from space from December 1974) -- the Interkosmos Program. The Socialist Republic of Vietnam became a participant in the Interkosmos Program in May 1979.

Twenty-two satellites of the Interkosmos series, 11 Vertikal' high-altitude geophysical rockets, and hundreds of meteorological rockets were launched under the auspices of this program, with the aid of which valuable research was conducted, the results of which have been made accessible to all the partners. The scientists of the brother nations were given the opportunity not only to send up their own instrumentation into space with the aid of Soviet boosters, but also to reap the fruits of the scientific and technological advances stimulated by the space program. It is not surprising that a number of items developed for the space program and manufactured in the Interkosmos Program participating countries are highly competitive in the world marketplace.

On 13 July 1976 representatives of the governments of the socialist nations met in Moscow to sign an agreement calling for cooperation in research and utilization of space for peaceful purposes. At the same time the Soviet Union presented a new initiative, proposing that the Interkosmos Program

participating nations take part in manned missions on board Soviet spacecraft and space stations together with Soviet cosmonauts.

Nine missions carrying international crews were flown between March 1978 and May 1981, missions which, alongside Soviet cosmonauts, included cosmonauts who were citizens of the Czechoslovak Socialist Republic, the Polish People's Republic, GDR, People's Republic of Bulgaria, Hungarian People's Republic, Socialist Republic of Vietnam, Republic of Cuba, Mongolian People's Republic, and the Socialist Republic of Romania. The principal task of the international crews was to perform scientific experiments which were a continuation of the research being conducted within the framework of the Interkosmos Program. These experiments were prepared jointly by scientists and specialists from the socialist countries. They have designed and built many scientific instruments for execution of the mission experimental programs, instruments which have proven quite effective. Close international cooperation is helping to develop the strongest facets of each partner in the common interest.

The optics industry and electronics in the German Democratic Republic, for example, are distinguished by a high technological level. The MKF-6M multiple frequency-band space photographic system, designed and built by scientists and specialists in the USSR and GDR, is presently operating on board the Salyut 7 orbital station. It is designed to study Earth resources. This photographic system was first employed in September 1976 on board the Soyuz 22 spacecraft, flown by cosmonauts V. Bykovskiy and V. Aksenov. The obtained photographs of the Earth's surface confirmed the equipment's fine quality. Specialists at the people's enterprise Carl Zeiss Jena (GDR) developed the special MPS-4 projector for processing exposed film, providing highly-precise matching of photographs and synthesis of color images.

Highly-skilled specialists and scientific teams have been developed in the cooperating countries during the years of work under the Interkosmos Program; they have successfully developed complex scientific equipment for space research and the program of space experiments. Some of them, with the assistance of Soviet scientists and specialists, have designed and built their own scientific satellites.

The Interkosmos-Kopernik 500 satellite was launched on 19 April 1973. This satellite, the ninth in the Interkosmos series, was constructed by Soviet and Polish specialists and dedicated to the 500th anniversary of the birth of the great Polish astronomer Nicholas Copernicus. At the proposal of the Polish Academy of Sciences, the Interkosmos-Kopernik 500 satellite studied the spectral characteristics of bursts of sporadic solar radio emissions in the frequency band 0.45-6.0 MHz, which cannot be observed from the Earth's surface due to the screening effect of the ionosphere.

The 18th satellite of the Interkosmos series was boosted into orbit on 24 October 1978. Up to 14 November it performed the role of carrier of the first Czechoslovak satellite, the Magion. Following separation of the Czechoslovak satellite from Interkosmos 18 in response to a command from Earth, it became possible to conduct an experiment involving study of the space-time structure of low-frequency electromagnetic fields in the ionosphere-magnetosphere plasma

by the method of synchronous measurements of one and the same parameters at two separated points in space.

The Interkosmos-Bolgariya 1300 satellite, developed jointly by Soviet and Bulgarian scientists, was boosted into orbit on 7 August 1981. The principal goal of its scientific program was to obtain data on the Earth's ionosphere and magnetosphere. Interkosmos-Bolgariya 1300 carried 15 instruments on board. Twelve of them, including a laser corner reflector, were of Bulgarian manufacture. The new scientific information obtained by this satellite included discovery of abnormally high bursts of electrical fields and ions, which can cause acceleration of charged particles.

In addition to purely scientific problems, many practical matters require joint resolution, matters pertaining to employment of space hardware, which is becoming increasingly more important for the national economy: utilization of satellites in meteorology, for long-distance communications, navigation, and study of Earth resources. It is therefore not surprising that instruments and scientific equipment originally designed for the space program are being utilized with increasing frequency in the national economy. For example, a Fourier spectrometer which was designed and built by GDR scientists and which operated successfully on the Venera 15 and Venera 16 unmanned interplanetary probes is being adapted for the conduct of highly-accurate chemical and biochemical studies and for rapid analysis at chemical plants. At least 10 instruments designed and built in socialist countries for the conduct of medical and biological investigations during missions by international crews have found application in medicine. These include the Hungarian Balaton, the Czechoslovak Oxymeter, the Polish Kardiolider, and others.

On 15 November 1971 representatives of nine socialist countries, convening in Moscow, signed an agreement on establishment of the Intersputnik international satellite communications system and organization. This concluded an important phase of preparatory work pertaining to establishment of a new international satellite communications system designed to meet the requirements of the countries it serves as regards telephone-telegraph communications channels, color and black-and-white television channels, as well as other kinds of information transmission via satellite.

The Intersputnik system uses Soviet communications satellites. Extensive international exchange of information on important political, international, cultural, and sports events taking place throughout the world is carried out with the aid of this system. In addition, scientific research, experimental design and experimental activities are carried out within the framework of Intersputnik, the purpose of which is to unify the efforts of the scientists and specialists of the socialist countries to solve current problems pertaining to designing, building and developing satellite communications systems. An international experimental section for utilization of new frequency bands for space communications needs has been established at Dubna, in the USSR, on the basis of equipment developed in the participating nations. Utilization of new, more economic and convenient space communications frequency bands will make it possible substantially to improve the quality of

transmitted and received signals, to reduce power consumption and costs, and substantially to increase flows of TV, voice and other information via satellite. (To be concluded)

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U.S. 'SPY IN THE SKY' PROGRAMS 'EXPOSED'

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 28-29

[Article, published under the heading "The Pentagon's Orbital Arsenal," by Col M. Krymov: "The Entire World Through a 'Keyhole'"; based on materials in the foreign press]

[Text] U.S. intelligence agencies, taking advantage of the extraterritoriality of space, began as early as the 1960's overtly deploying various intelligence-gathering systems in space, in the hopes of keeping every part of the world under surveillance.

The first Discoverer satellites were intended primary for perfecting space photographic equipment and techniques of returning containers with exposed film. The most unsophisticated images of the Earth's surface were obtained in the course of these tests, which confirmed, however, the future promise of the chosen areas of development. Simultaneously they were working on development of principles of satellite utilization to detect launchings of strategic ballistic missiles. During that same period the U.S. Air Force commenced development of specialized weather satellites and electronic intelligence satellites. Ten years later U.S. leaders, utilizing advances in the space program to further their own schemes, were very close to establishment of a global satellite reconnaissance system.

Such a system was essentially established in the 1970's. It included photoreconnaissance and electronic intelligence-gathering satellites, ICBM launch early warning satellites, marine surveillance and weather reconnaissance satellites. Recently orbital systems to reconnoiter and surveil man-made objects in space which have been under development have begun to be included in this space "intelligence community."

The Pentagon literally flooded near-earth space with various espionage hardware in its endeavor to place the entire world under continuous surveillance. In the 1960's and 1970's more than half of all the space vehicles launched in the United States were intelligence-gathering satellites, for the most part photoreconnaissance. Their percentage share has dropped somewhat in recent years, but this by no means indicates curtailment of the various programs but is due to movement on-line of satellite reconnaissance

systems with a longer useful life and high output. As foreign experts note, today there can be in orbit each day as many as three U.S. photoreconnaissance satellites capable of surveilling any area of the world with a periodicity of several days.

According to reports in the foreign press, today the arsenal of the Pentagon and the U.S. intelligence agencies contains photoreconnaissance satellites of at least three types. These include high-detail photoreconnaissance satellites, formerly officially designated SAMOS, the Big Bird combined photoreconnaissance satellite (high-detail and broad area coverage), and the new generation KH-11 (Keyhole).

The function of satellites of the SAMOS type is to obtain high-resolution images of the Earth's surface. Exposed film is returned to Earth by two containers, which are snared by aircraft during their descent by parachute. Satellite useful lifespan is relatively short, averaging 50-80 days.

Big Bird satellites operate for 5-7 months. This is the heaviest and largest of all the U.S. military satellites. It weighs approximately 12 tons and measures 17.7 meters in length and 3 meters in diameter. The camera carried by this satellite is fitted with a lens with a focal length of more than 2.5 meters and can produce a resolution of 0.3-0.5 m on the Earth's surface from an altitude of 160 km. Large-area surveillance images are transmitted to the ground by radio link. Detailed reconnaissance images are returned to the Earth on a regular basis, at specified time intervals, by four containers which separate from the satellite. The orbital parameters of the SAMOS and Big Bird satellites are contained in the table.

Orbital Parameters of SAMOS and Big Bird Satellites

Orbital Parameters / Satellites	Inclination, degrees	Apogee, km	Perigee, km
SAMOS	96.4	350	110-125
Big Bird	96.4	250	160

Development of the KH-11 satellite was reported at the beginning of the 1970's, a satellite designed to transmit images in digital form by radio link. At ground stations the received digital information is recorded onto magnetic tape and photoelectronically converted to a photograph. Although, according to statements by Western specialists, the KH-11 does not provide images with as high a resolution as SAMOS satellites, the KH-11 does have certain advantages. First of all, transmission of images to the Earth is virtually on a real-time basis and, secondly, obtaining information in digital form opens up the possibility to automate image processing. For example, the contrast of an image can be increased, or it can be transformed to various projections. According to official reports a KH-11 satellite has a useful life in orbit exceeding 2 years.

In the opinion of U.S. strategists, photoreconnaissance satellites possess one substantial drawback. They are unable to conduct reconnaissance at night, through cloud cover, or in other adverse weather conditions. In connection with this the Pentagon is planning to develop all-weather reconnaissance satellites capable of conducting surveillance both during hours of darkness and through cloud cover.

The information obtained from the photographic spies is supplemented by data picked up by snooping electronic intelligence satellites. The United States has developed and deployed several Ferret satellite systems. They carry equipment to conduct electronic intelligence-gathering across a broad range of frequencies and are capable of detecting sources of radioelectronic emissions along a track approximately 3,000 km wide.

The foreign press has carried reports about another type of U.S. electronic intelligence satellite -- the Rhyolite. These satellites are designed to intercept telemetry data during test launches of rockets of various designation. These satellites are boosted into synchronous and stationary orbits and form a space reconnaissance system capable of surveillance-covering all ranges from which rockets are launched. It is reported that in addition to the two principal Rhyolite satellites, the system also includes two backup satellites which, in the estimate of U.S. experts, will enable the system to continue operating for several more years, until the more sophisticated Aquacade satellites commence deployment.

Even individual branches of the U.S. armed forces are flourishing in the business of space espionage. According to statements by U.S. Navy officials, they have designed, built and are utilizing as assets of their space command their own marine electronic intelligence satellites, NOSS, and are also taking part in a number of promising marine radar reconnaissance satellite projects.

NOSS satellites are designed to provide global surveillance coverage of the World Ocean, to intercept radio communications traffic and to obtain a position fix on surface ships and submarines. Three such satellites, boosted by a single launch vehicle into an orbit at about 1,000 kilometers, subsequently maneuver onto parallel paths spaced at several dozen kilometers. It is reported that NOSS satellites carry infrared sensors to track nuclear-powered submarines by their thermal wake. According to information in the foreign press, intelligence gathered by U.S. ocean reconnaissance satellites were used by the British during the Anglo-Argentine military conflict in the Malvinas (Falkland Islands) in 1982. It was reported in particular that the location of Argentine naval ships was determined with the aid of these satellites.

The ICBM launch satellite early warning system occupies a special place in the overall aggregate of missions performed by U.S. reconnaissance satellites. To date the Pentagon has deployed a system containing three DSP early warning satellites placed in stationary orbit above the Indian Ocean, the Pacific, and over South America. Each of these satellites, weighing about 1,150 kg, is equipped with an infrared telescope. Satellite rotation on the longitudinal axis provides a scan of its surveillance coverage area every 8-12 seconds. A source of infrared emission (the exhaust flame of a rocket being launched, for

example) is observed during several sequential scans. Its current position is determined during each scan, and thus moving heat sources are distinguished among stationary sources. It is noted that DCP satellites can detect a rocket 50-60 seconds after launch and will transmit this fact to ground receiving stations no later than 90 seconds after launch.

Foreign experts are considering the possibility of upgrading DSP satellites by equipping them with infrared sensors with a mosaic photodetector capable of detecting not only ballistic missiles but also bombers in flight. It is anticipated that they will provide more efficient target tracking than the scanning infrared sensors currently in use.

DSP satellites are also employed for radiac reconnaissance. For this purpose they carry proton counters and instruments to record X-ray emissions, with the aid of which nuclear strikes can be detected and evaluated. The U.S. Department of Defense is also planning to place such sensors on Navstar navigation satellites in order to expand capabilities to conduct radiac reconnaissance on a global scale.

And finally, the Pentagon operates its own global weather satellite system, which is utilized, according to statements by U.S. Air Force spokesmen, "for meteorological support of all functions performed by the Air Force in various parts of the world...." System components include DMSP satellites, which are boosted into solar-synchronous, near-circular orbits of about 800 km. These satellites carry on board a scanning radiometer with four sensors, designed to receive images in the visible and infrared regions of the spectrum. Information on cloud cover and atmosphere characteristics can be transmitted to ground receiving stations both on a real-time basis and with delay, via an onboard data storage device. In the opinion of Western observers, support of the functioning of photoreconnaissance satellites is one of the principal areas of utilization of DMSP satellites.

A report of a new Pentagon space project recently appeared in the Western press. It once again confirms the endeavor on the part of U.S. military and political leaders to turn space into a new theater of military operations. According to the schemes of the authors of this program, an orbital-basing system will be deployed, capable of tracking communications and navigation satellites as well as other space vehicles of the "potential adversary." There is no attempt to conceal the fact that all this in the final analysis is aimed at supporting the operations of various antisatellite systems, to the development of which the U.S. Government has now given the green light and the banning of which is being so vigorously resisted by the Pentagon.

These are the present realities and plans for development of a global satellite espionage system which, as is evident from announced U.S. plans, should continue to be the U.S. "first-priority space program" in coming years. Such are the calculations of those who are hoping to build a road to military superiority via space.

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CHANGES IN THIRD-GENERATION FIGHTER TACTICS CONSIDERED

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[Article, published under the heading "Tactics and Simulation," by Military Pilot 1st Class Col Yu. Kislyakov and Col V. Dubrov: "New Features of Air Combat"; second part of a multiple-part article, first part appeared in No 9, 1984]

[Text] 2. On the Road Toward All-Aspect Close-Range Combat

Visual contact between adversaries and employment of short-range weapons are considered to be the principal distinctive features of close-range air combat. In connection with the improvement of aircraft, however, existing modes of offense and defense, evasion techniques and types of attack are taking on new features, expanding the pilot's tactical arsenal.

The tactics of close-range combat did not undergo appreciable changes as long as fighter aircraft continued to be armed with rigid-mount cannons as well as the first two generations of short-range heat-seeking (TGS) missiles. The area of possible attacks (OVA) consisted of a cone-shaped area with an apex angle of up to plus or minus 40 degrees from the aircraft's longitudinal axis and up to 1.85 kilometers in height. If the pursuing fighter succeeded in entering this cone, downing the adversary became a realistic possibility. Many kinds of maneuvers to enter or exit from the OVA, which were handed down from generation to generation, were grounded on turning speed in any plane and on the pilots' outstanding flying ability and gunnery skill. Tight-radius steeply-banked turns, chandelles, half-rolls, oblique loops, slow and snap rolls were component elements of tactics. The two-aircraft element was considered inseparable as the primary tactical unit.

According to a report in the foreign press, in the 1982 Lebanon conflict Israeli F-15 and F-16 fighters employed improved AIM-9 Sidewinder missiles with a more sensitive infrared seeker, which had a lock-on zone of 28 degrees in underwing configuration. The area of possible attacks in close-range combat became larger, now running plus over minus 150 degrees from the aircraft's longitudinal axis. Attack from the forward hemisphere at an aspect of 1/4 became a realistic possibility. The high closing speeds on a head-on course, however, gave little time to aim, a maneuvering adversary was quickly

in and out of the lock-on zone, and extremely fast reactions were required of the pilots, and in conditions of a real threat of colliding with the target. The experts believe that the mandatory coordination between these elements was disrupted in the current "man-machine" system. In addition, difficulties arose with determination of the target's nationality both visually (by external characteristics) and with IFF gear. Thus obstacles arose on the road to all-aspect close-range combat which made it impossible to employ any fundamentally new tactical devices or combat maneuvers. Tactics continued to be based on tested and proven methods of gaining a positional advantage, as well as on delivery of fire from short range from the rear hemisphere. Only the point at which closing commenced displaced somewhat.

Problems pertaining to increasing a fighter's combat effectiveness in close-range air combat were designated on the basis of obtained experience. They were connected with inadequate aircraft maneuverability, difficulty in target tracking, high stress load on the pilot, and poor accuracy and reliability of weapon control systems.

AVIATION MAGAZINE stated that until such time as operating an aircraft required continuous analysis of information, the pilot himself processed incoming data, made decisions and operated in conformity with the situation. Today the flow of data from numerous sensors is so great that engineers have begun integrating information and improving the forms of presenting it. This is grounded on the principle of adaptation of the aircraft control system to the pilot's capabilities and compatibility with airborne systems. Information from sensing devices is fed into an onboard digital computer, in which control commands are formed and subsequently transmitted to control surfaces. The pilot is freed from solving problems which demand extremely fast response or performance of complex coordinated maneuvers at critical phases of combat.

The F-16 close-range combat fighter has currently become a "participant" in the AFTI program, which is to test promising technology for new-generation fighters. This aircraft is considered a continuation of the concept of the highly-maneuverable fighter with an integrated flight control and weapons control system.

The F-16 fighter's onboard electronics is integrated on the basis of digital systems, which combine target search and tracking devices with gunsight (situation display) and controls. It includes a radar and head-up display, a helmet-mounted target designation system, and aircraft controls. Upon reaching target visual detection range, the pilot turns his helmet target designation system in the direction of the target (places the sighting line on the target). When the miniature crosshairs align with the observed enemy aircraft, an annunciator light comes on and the target is taken by automatic tracking. The head-up display contains information on flight conditions as well as weapons readiness. During closing the system generates an error signal -- indicating the the angle between direction to target and direction of weapon aim. The magnitude of "error" is transmitted to the aircraft control system, which compensates for the error (without pilot intervention).

In close-range air combat closing (if the adversaries see each other) terminates with a contest for positional advantage. Up to this point maneuver

consisted of aircraft motion in any plane along an arc of various curvature. Entry into the area of possible weapon employment was determined chiefly by superiority in rate of turn. An improved aircraft control system makes it possible to execute so-called unconventional maneuvers. Endeavoring to take an advantageous position for attack, the pilot of a conventional aircraft adjusts his rate of turn by displacement of the control stick and pedals. The pilot of an AFTI F-16 aircraft applies pressure only to the pedal -- the aircraft turns without banking (with a skid). In addition to flat turns, the system puts the fuselage into a vertical angular orientation without changing the direction of the velocity vector, displaces the aircraft vertically and horizontally without change in pitch and yaw angles, and executes climb and descent without changing angle of attack. New kinds of maneuvers are executed within restricted limits relative to the flight trajectory.

As flight experiments (and semi-fullscale modeling results) have shown, utilization of direct control of lift and lateral forces makes it possible to reach the area of effective weapons employment faster or to evade attack by the adversary in a critical situation. For example, the well-known reverse and break maneuvers are supplemented with new elements -- abrupt aircraft "throws" in the direction of the target (or away from it) in the terminal phase. Experts believe that fighter survivability in close-range combat can be increased by several orders of magnitude thanks to abrupt changes in direction of flight. But one condition is mandatory: capabilities of pilot and those of aircraft must be integrated. There is no substitute for the human operator in solving logical problems in a complex and dynamic air environment. Modern hardware (electronic computer), however, can do a better job than the pilot in correcting an aiming error, turning the aircraft to the required angle of lead, and adjusting direction of fire.

Studies are also currently in progress to determine the possibilities of freeing the pilot from the work stresses arising during monitoring and operation of cockpit devices. The number of switches, displays, instruments, and control panels does not diminish, while the pace of combat quickens. Continuous manual on- and off-switching of devices diverts the pilot away from observing the air situation, which is intolerable during threat of hostile attack. From 7 to 8 buttons have already been mounted on the throttle lever and control stick so that the pilot does not have to reach over to the instrument panel clusters. But when the pilot's hands and feet are fully engaged in flying the aircraft and his mind and eyes are maximally work-loaded, unutilized reserves remain -- speech and hearing.

Systems with voice synthesis are being developed and put to the practical test in flight within the framework of the program, systems which enable the pilot to use the aircraft's equipment without employing the conventional manual control scheme. The pilot records standard voice commands on tape (with his own characteristic intonation) and inserts the cassette into the control unit "memory" (capacity up to 100 commands). After sizing up the air situation, for example, he might say: "Search mode -- 40 miles." He will then hear in his headset the synthesized-speech response: "Mode set." On the head-up display a symbol lights up next to the designated range (the same as with manual control), and the radar switches to the selected operating mode.

In the course of initial testing in simplified conditions, 90-percent voice control system reliability was achieved; however, in the opinion of the experts, in stress situations in air combat a pilot is in a state whereby it is difficult for him to speak at all. This question should be clarified following tests in a situation approximating actual combat. Nevertheless the selected direction of development has been acknowledged to be promising.

As indicated by the foreign press, in aerial combat over Lebanon cannons were fired only in 7 percent of the total number of recorded attacks. One restricting factor was the necessity of bringing an aircraft onto the adversary's tail at a range of less than 700 meters. An increased angle of approach, as always, required firing with a lead. Accuracy in determining this lead, as well as rapid turning of the aircraft into the target, were performed with errors which influenced effectiveness of fire.

Recently an evaluation was made of fire control systems for rigid-mount and swiveling cannon utilizing a flight and firing conditions matching unit. In firing the fixed cannon a moving aiming mark would be set in conformity with the calculated lead. The method of aiming differed little from the current method, but was more accurate. Movement of the aiming mark was limited to the head-up display area. Upon approaching the edge it would begin to blink, warning the pilot that a heading adjustment was necessary. The command to open fire would be given after it was placed on the target at a range between 20 and 150 meters.

When using a swiveling cannon which displaces in the plane of pitch and yaw in response to automated fire control system commands, a rectangular frame would appear on the head-up display. The pilot would fly the aircraft so as to have the target with the superimposed aiming mark enter this frame at a range of 820-150 meters. This would be followed by the signal to open fire.

When the matching unit would be connected into the fire control system, with aircraft flying within the 20-30 degree radar scan sector, the pilot would lock onto the target by pressing a button, after which it would be tracked automatically. A special automatic thrust reverser would hold the aircraft at the most advantageous firing distance, slowing down the closing (to create favorable aiming conditions and to prevent the aircraft from overrunning the target).

In simulator tests five pilots fought 25 air engagements with each variation. Analysis indicated that effectiveness of fire in close-range combat is greater when utilizing the new hardware and methods. The pilots reported that the work load is reduced during flight and fire matching, which is very important in combat with a numerically superior adversary. The requirements of bringing the aircraft into the aim-adjustable area of possible attack were satisfied by rough maneuvering, while precise target tracking was accomplished automatically. The number of actual hits and successful bursts from the swiveling cannon were approximately twice those of the fixed cannon. This was assisted by the automatic deceleration system, which held the aircraft during firing at a range between 305 and 122 meters.

Flight experiments indicated that it is sufficient to turn the cannon mount 4-6 degrees to increase firing effectiveness. Capability to swing the barrel at a rate of 40 degrees per second increases probability of hitting the target with the first round in a burst. It is believed that when employing a cannon which is rigidly aligned on the aircraft's longitudinal axis, the pilot unproductively wastes time on turn adjustments into the target. When attacking from the rear hemisphere, when the target was at an angle of 75 degrees from the crosshairs, the pilot would switch on the automated system, which would automatically turn the aircraft to the line of aim.

Linkages between two kinds of combat -- close-range and medium-range -- were also tested in the course of semi-fullscale simulation. During tests involving controllable cannon armament, the closing phase was accomplished with the aid of onboard radar, which would determine the sighting (aiming) line, air target speed and acceleration. The obtained data would be fed into the combined flight and fire control system. This would achieve earlier readying of weapons for employment in the forward hemisphere. Thus contrary to conventional notions, close-range combat would commence at points beyond the limits of visual detection of the adversary. All-aspect employment of short-range weapons required information (input data for head-on attack) which could be obtained only by electronic systems.

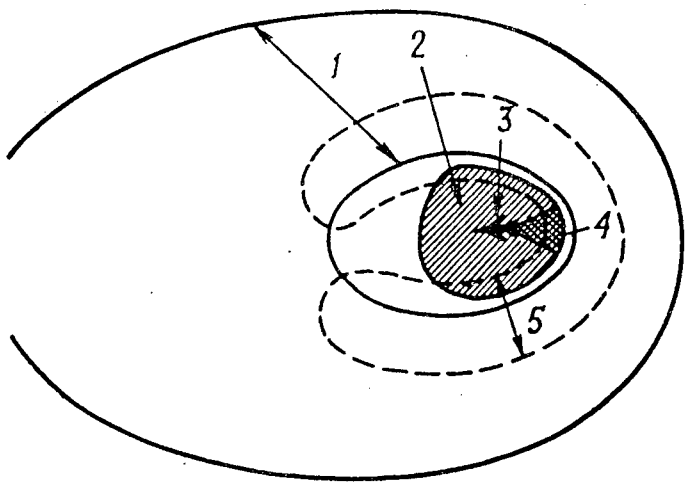

Diagram of zones of possible directions of flight of an attacking aircraft relative to the target aircraft and expansion of the zone of effective cannon fire to all-round (360 degrees) when employing a gunsight coupled to onboard radar

Key: 1, 5 -- zones of aimed firing of AIM-7 Sparrow medium-range and AIM-9 Sidewinder close-range air-to-air missiles (respectively); 2 -- all-round zone of effective cannon fire employing gunsight and onboard forward-looking radar; 3 -- target aircraft; 4 -- sector of effective cannon fire when employing a lead-computing gunsight

The process of transition from one type of air combat to another, involved with changing type of weapons, can be followed in the example of actions by the pilot of an F-18 Hornet. If the target is detected at a range ruling out employment of radar-guided weapons (it is too late to engage in medium-range combat), the pilot selects heat-seeking missiles, such as the Sidewinder, for example. The seekers are uncaged, directed along the radar sighting line, and lock onto the target upon entering its thermal emission detection zone. The pilot determines the target's position in relation to the aiming mark (crosshairs) either by the head-up display or visually as he closes. After he verifies target lock-on, he merely waits for the signal to fire. Authorized launch range for heat-seeking missiles when closing head-on is as much as 15 km.

The pilot employs a 20 mm fixed cannon for a close-range attack, employing the director-type gunsight on the head-up display. The radar switches over to precision tracking and lead computing mode. The pilot must put the pipper circle which has appeared on the display onto the visually-spotted target, that is, execute an alignment maneuver, and then open fire. The radar antenna can turn within a range of 60 degrees from the sighting line to lock onto a maneuvering target. An area of 20 x 20 degrees is observed when it is necessary to restrict observation to the head-up display field of view.

Thus the expanded areas of effective employment of heat-seeking missiles are at the present time merely a precondition for substantial changes in the tactics of close-quarters air combat. The all-aspect cannon attack has not yet advanced from the test bed to flight experiment and in-air testing. Semi-fullscale simulation on the ground indicates that after firing into the forward hemisphere, aircraft can diverge on "overshoot" with a safe separation. But this requires execution of an unconventional maneuver, whereby the aircraft is controlled by an automatic device which responds simultaneously to the flight of its own aircraft and the adversary's motion parameters.

From our description of the procedures followed by the pilot of an F-18 aircraft it is evident that the traditional tactics of close-quarters combat, with inclusion of elements of medium-range combat (closing on the basis of onboard radar data) is a present reality. Combat maneuvers continue to be divided into single-aircraft and group, defensive and offensive. An aircraft pair continues to remain an element, that is, the basis of the formation. The two-aircraft element can break up into its individual members only in critical situations which require employment of maximum allowable performance. Tactics involving a temporary break in fire coordination between leader and wingman are authorized, but maintaining tactical teamwork. It is believed that after the F-16 is equipped with improved radar and AMRAAM missiles, all modern fighters of the air forces of the NATO member nations will be capable of conducting both close-quarters combat and combat at medium range. (To be continued)

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CAREER OF FORMER LONG-RANGE BOMBER AVIATION CHIEF OUTLINED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 32-34

[Article, published under the heading "A Word About Air-Force Veterans," by Lt Gen Avn (Ret) S. Fedorov: "Winged Flagship"]

[Text] Long-range aviation (ADD) played an important role in defeating fascist Germany and its satellites. Since the very first days of its existence it occupied a worthy position within the system of the Soviet Air Forces. As elements of the principal striking forces, its units and combined units fought aggressive combat actions in many operational and strategic sectors, as well as on fronts from the Barents Sea to the Black Sea. Long-range bomber crews took part in all major ground forces operations, flew independent attacks aimed at interdicting rail traffic, and flew massive strikes against airfields and important industrial targets located deep in fascist Germany's heartland. They also helped maintain communications with large partisan detachments.

During the Great Patriotic War long-range bomber crews flew 219,788 sorties and dropped 2,266,000 tons of bombs on fascist troops and installations. On repeated occasions they flew important cargo to Yugoslavia, flew to partisans in Czechoslovakia, and conducted aerial reconnaissance. During that difficult, stressful period Long-Range Aviation was headed by prominent Soviet military commander Chief Mar Avn A. A. Golovanov, who would have been 80 years old this year.

Lt Gen Avn (Ret) S. Fedorov, chairman of the Presidium of the Council of Veterans of Long-Range Aviation, tells about party member Aleksandr Yevgen'yevich Golovanov and his role in the establishment and development of Long-Range Aviation during the Great Patriotic War.

Fifteen-year-old Aleksandr Golovanov received his baptism of fire as a member of the 59th Rifle Regiment, battling Denikin's bands. After the Civil War came to an end, he returned to his native Nizhniy Novgorod. There he got his

first job and at the same time continued his studies. Beginning in 1924 he worked for a number of years in OGPU [United State Political Directorate]. Aleksandr Yevgen'yevich always began every job with great desire and a serious attitude.

Golovanov joined the ranks of the party of Lenin in 1929. He lived up to the lofty title of Communist with volunteer civic work and labor activity. He was sensitive toward and constantly concerned about others. Everybody who knew well this outstanding individual and high-principled Communist noted his cordiality and responsiveness, his boundless energy, his enormous stamina, and his ability to debate in a well-reasoned manner and to defend his opinion in a worthy fashion.

Three years later A. Golovanov transferred to a position at the People's Commissariat of Heavy Industry. At that time he, just as thousands of Soviet boys and girls, was fascinated by the romance of the skies. Aviation had won his heart over forever. At the age of 28 Aleksandr's dream came true: in 1932 he graduated from the flight school attached to the Central Institute of Aerohydrodynamics and became a pilot for the Civil Air Fleet.

Aleksandr Yevgen'yevich worked hard and selflessly in civil aviation. His reputation with and respect from his comrades and superiors steadily grew. Persistent in his work, he made steady progress up the flying career ladder, continuing to be demanding on himself. He did a good deal of studying on his own, worked hard and persistently to master aircraft equipment, and took a lively interest in the latest works of literature and art.

Two years later Golovanov was placed in charge of a special detachment of heavy aircraft, and several years after that was named head of the Eastern Siberian Administration of the Civil Air Fleet. From 1937 he served as chief pilot of a special squadron in Moscow.

Whatever assignment Aleksandr Yevgen'yevich was given, he went deeply into it and carried it out with enthusiasm, always with an eye to the future. Golovanov saw a bright future for aviation. He felt that it would play an important role in an age of rapid technological advance. Aleksandr Yevgen'yevich took part more than once in military conflicts of that time. And on each occasion he became convinced of the enormous significance of aviation in victory over the enemy. When the Japanese militarists initiated military operations in the vicinity of the Khalkhin-Gol River, the command authorities assigned A. Golovanov a number of important missions in support of the Soviet forces, which he carried out with honor, for which he was awarded the Order of the Red Banner.

Aleksandr Yevgen'yevich devoted much attention to study of the paths of development of aircraft abroad, subsequently skillfully applying in a practical manner the knowledge he had amassed. During the fighting with the White Finns he flew numerous weather reconnaissance missions and dropped leaflets over cities and towns in Finland. He flew these missions during daylight, as a rule in instrument weather. His crew always performed confidently and resolutely, demonstrating a high degree of professional skill

and great composure. This intrepid pilot was awarded the Order of Lenin for his military exploits.

In the meantime practical realities were urgently facing aviation with new problems and tasks. The raging flames of World War II were drawing ever nearer to our country's borders. There was not a single month or even day to lose in strengthening the homeland's defense capability and increasing the combat power of the Red Army and its Air Forces. Creation of a long-range bomber arm in the very near future had to be given a good deal of thought. Taking combat experience into consideration, it was acknowledged advisable to commence teaching pilots to fly in instrument conditions with employment of avionics. This would reduce to a minimum combat aviation's dependence on weather conditions. Two higher schools for navigators were established for the purpose of accomplishing such important tasks. It was decided at the same time to equip bombers with the requisite gear, first and foremost the RPK-2 radio compass.

Aleksandr Yevgen'yevich had long been thinking about turning to the party Central Committee with specific proposals which would help enhance combat capabilities of long-range bombardment aviation. And he did so, writing I. V. Stalin a personal letter in which, based on the experience of his missions in Finland, he substantiated the necessity of taking immediate steps to teach instrument flying to long-range bomber crews. Extensive technical and tactical knowledgeability, depth of thought process, scientific foresight and comprehensive knowledge of the development of bomber aviation abroad led him to the firm conviction of the necessity of forming a special aviation combined unit for this purpose.

He did not have to wait long for an answer. A. Golovanov's proposal was approved and was implemented with some changes. For example, an aviation regiment was established in place of a combined unit. This took place in February 1941. And a team of experienced pilots was drafted into the Air Forces from Civil Aviation to ensure the fastest possible mastery of "blind" flying. This team was assigned to the regiment, which was under the command of Lt Col A. Golovanov, who by that time had logged 4,300 hours on civilian aircraft.

Aleksandr Yevgen'yevich, energetically and with his characteristic selflessness and dedication to his job, proceeded to carry out the important task assigned by the command authorities. This gifted pilot took only a few days to transition to a new combat aircraft -- the Il-4 bomber. Prior to commencing to master instrument flying, the aircrews had to complete training and precision formation flying, aerial gunnery, and bombing. But the war, which had broken out in the meantime, interrupted the training.

The men of the 212th Bomber Regiment, under the command of party member A. Golovanov, from the very first day of the war commenced active combat operations against the fascist invaders. Aleksandr Yevgen'yevich led long-range bombers on missions to destroy enemy panzer columns and mechanized groups at Brest, Baranovichi, Grodno, and Minsk. In spite of the element of offensive surprise gained by the aggressor, and in spite of losses of equipment, Lieutenant Colonel Golovanov succeeded in maintaining the

regiment's combat efficiency. Working in close contact with political workers and staff officers, and working jointly with the party and Komsomol organizations, he constantly maintained strong morale in the men and mobilized them to engage in a dedicated and determined struggle against a wily and savage foe. Golovanov's commander talents were vividly manifested at that difficult time, and his organizer abilities were extensively revealed.

The 81st Air Division was hastily formed in July 1941 at airfields in the Moscow area. Its regiments were equipped with Il-4, Yer-2 and TB-7 (Pe-8) aircraft. Initially the division was commanded by Hero of the Soviet Union M. Vodop'yanov, but soon Col A. Golovanov assumed command. At the end of 1941 the 81st Bomber Division was redesignated 3rd Bomber Division, and its commanding officer was given the rank of major general aviation. As of 1 January 1942 the division's aircrews had flown more than 1,000 combat sorties and had dropped onto the enemy more than 1,000 tons of bombs of various size.

Following the crushing defeat of the German-fascist forces at Moscow, the State Defense Committee made the decision to concentrate Air Forces bomber units, establishing an operational-strategic command -- ADD (Long-Range Aviation). Lt Gen Avn A. Golovanov, commander of the 3rd Bomber Division, was named commanding general of the new large strategic formation.

A headquarters staff, political section, rear services, engineer service, signal service with radiotechnical troops, navigator and other services were established at ADD headquarters. The 3rd, 17th, 24th, 36th, 45th, 48th, 50th, and 52nd bomber divisions were reassigned to the large strategic formation. Maj Gen Avn N. Skripko was appointed first deputy commander, Lt Gen Avn M. Shevelev was appointed chief of staff, and Maj Gen G. Gur'yanov was designated military council member. They served as good assistants to A. Golovanov in directing ADD units and combined units.

The Long-Range Aviation command authorities had a difficult job to do. They had to establish in short order an aviation organization which was new in form and content, and without ceasing combat sorties. And the ADD headquarters staff and services, operating under the most difficult conditions, were required immediately to exercise command and control over the combat operations of divisions which were deployed in all sectors of the Soviet-German front.

The ADD commander made decisions boldly and prudently, and implemented them with enviable persistence. While possessing the ability quickly to perceive and gain a good feeling for all new things, Golovanov never disregarded the experience and know-how of his subordinates and had the ability to listen to them attentively. He personally examined and went deeply into any matter which arose.

Golovanov's organizing talent as a military commander was vividly revealed in the position of commanding general of this large strategic formation. A highly skilled pilot who had war experience, he had his own opinion, grounded on his combat experience and know-how, about development and utilization of long-range bombers in the performance of combat missions.

ADD bore various names in the course of its history, but it always comprised the striking force of the High Command. Its aircrews were trained to fly night missions. During the first days and months of the Great Patriotic War it suffered unwarranted losses and casualties in daylight missions. This made it necessary to shift to active night operations. But mission effectiveness was diminished primarily due to deficiencies in command and control. Overall direction of bomber units, for example, was exercised from Moscow, while operationally they were subordinated to the fronts. Therefore with the establishment of ADD there commenced active strikes on the most important targets by several units and even air divisions, and not only at tactical but operational depth as well.

The navigator service would determine for long-range bomber crews their IPM (flight departure point), route path, and turning point to target. These measures ensured safety and a high degree of effectiveness of employment of ADD and made it possible to organize precise monitoring of execution of combat missions by each aircrew and unit.

In addition, as the war progressed ADD was continuously receiving additional aircraft, thanks to a competent effort by the home front. ADD capabilities and role in Air Forces combat activities were increasing as a result.

ADD experienced quantitative growth over a short period of time and became a powerful, mobile force. Having begun with 23 bomber regiments, by the end of the Great Patriotic War it possessed 8 aviation corps and 2 separate divisions. The large strategic formation had established its own schools for flight and technical personnel and two schools for training night-flying aircrews.

The role of Long-Range Aviation had increased greatly in the overall combat activities of the Air Forces. While approximately 300 combat aircraft took part in bombing enemy targets in the Battle of Moscow, they totaled approximately 1,500 in the Berlin Operation.

A. Golovanov always considered the development of tactics and operational art as well as aircraft capabilities in accomplishing complex combat missions. He concerned himself with improving the combat proficiency of ADD personnel in conditions of combat operations, as well as their ideological and moral-psychological conditioning, and effective employment of long-range bomber crews in combating the enemy.

The ADD command and staff, under the guidance of A. Golovanov, achieved high maneuverability of ADD assets in the course of the historic Battle of Stalingrad. In the latter half of August 1942 Hq SHC [Headquarters, Supreme High Command] assigned a difficult mission to ADD: to deliver massive bombing strikes on military-industrial targets in fascist Germany and Germany's satellite countries, simultaneously with aggressive operations in support of ground forces at Stalingrad. And the aviators successfully accomplished both tasks.

Aleksandr Yevgen'yevich guided ADD operations skillfully and firmly, staunchly overcoming all difficulties. But the situation at the front was facing ADD

with more and more new tasks, while not diminishing the previous ones. Its aircrews delivered food, medicine, and fuel to troops in a difficult situation, evacuated wounded, transported reserves from one sector to another and light weapons and ammunition from the home front to the battlefront, dropped paratrooper assault forces, and continuously maintained contact by air with all large partisan detachments. When in June 1942 our command authorities discovered the presence of a large force of enemy troops and equipment near the town of Shchigry, to the east of Kursk and Oboyan, ADD aircrews had their hands full. During the course of six nights they delivered bombing strikes on the fascists. Up to 100 aircraft or more took part in each such strike.

Airfields, frequently field airstrips, accommodating load transfer operations, were required to ensure efficient ADD operations. Preparation of such fields involved considerable difficulties, for all measures had to be conducted in such a manner as to prevent the enemy from discovering the intentions of our command authorities.

As we know, long-range bomber crews flew strikes on Berlin, Budapest, Bucharest, Stettin, Koenigsberg, Danzig, and other important fascist bloc industrial and military targets. On these raids long-range bomber personnel displayed a high degree of flying skill, great courage, and boundless devotion to the socialist homeland.

ADD successfully accomplished difficult combat missions under the direction of A. Golovanov. From December 1944 he was in command of the 18th Air Army, into which Long-Range Aviation had been reorganized.

We should emphasize that during the years of the Great Patriotic War, thanks to constant concern on the part of the Communist Party, Long-Range Aviation was transformed into a large operational-strategic formation. A total of 5 aviation corps, 12 divisions, and 43 regiments of ADD were given the guards appellation, while 6 air divisions and 38 air regiments were awarded decorations for their distinguished combat accomplishments. Approximately 40,000 persons were awarded medals and decorations, more than 240 aviators were awarded the title Hero of the Soviet Union, while S. Kretov, A. Molodchiy, V. Osipov, V. Sen'ko, P. Taran, and Ye. Fedorov were twice named Hero of the Soviet Union.

After the Great Patriotic War Chief Mar Avn A. Golovanov commanded Long-Range Aviation for several years, after which he continued service in important Air Forces positions. He was elected deputy to the USSR Supreme Soviet, 2nd Convocation. Aleksandr Yevgen'yevich kept in constant contact with aviation veterans and veterans of the Great Patriotic War, and frequently got together with young aviators, who had great respect and affection for him. He willingly shared with them his wealth of combat experience, indoctrinating them as staunch and courageous defenders of the socialist homeland.

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DESIRABLE COMMANDER TRAITS ANALYZED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 4) pp 34-35

[Article, published under the heading "Marching in the Vanguard," by Col V. Lebedev: "Commander Maturity"]

[Text] Veniamin Mikhaylovich Repin enjoys considerable respect in the guards aviation regiment and is known as a vanguard officer and skilled indoctrinator and mentor of his men. He always supports intelligent initiative, will determine with his commander's sensitivity of perception the significance of innovation efforts by squadron Communists or Komsomol activists, and he will give advice on how better and more efficiently to find a correct solution.

Lieutenant Colonel Repin discusses youth affairs in an enthusiastic and interested manner. He likes to get together with Komsomol activists in a relaxed atmosphere. Whenever the opportunity presents itself, he will most assuredly inquire how things are going in the subunit Komsomol organization and how the young aviation personnel are organizing their off-duty time. He frequently attends Komsomol meetings and squadron Komsomol buro sessions, specific-topic evening activities, reader conferences, and he will most assuredly be present at every get-together with the outfit's veterans. The commander has the ability to focus young aviation personnel on performance of specific tasks taking into consideration each individual's abilities. The young men respond to his paternal concern and fair-minded commander demandingness with sincerity and profound respect, and they endeavor to perform their job-related duties as well as they can and to display initiative and innovativeness in their military labor.

People are impressed by party member Repin's modesty, politeness, and tact. Even in a high-stress combat training situation he is always cool and composed, and his voice sounds calm and confident. And this has a strong emotional effect on his subordinates. Veniamin Mikhaylovich follows a principle which was well stated by CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, in his address at the 5th Armed Force Conference of Komsomol Organization Secretaries: "It is necessary to adopt the rule of spending more time where young people work, study, and spend their leisure time, discussing important, urgent matters with them in a frank manner. Besides, this is important not

only from a political but, I would say, from a psychological standpoint as well. In the course of such contacts one becomes infected by the energy of youth, one sees familiar facts in a new light, and one begins to gain a better understanding of the real features and distinguishing traits of today's youth."

Lt Col V. Repin has helped many a young pilot, navigator, engineer, and technician. He was once commander of a squadron in which the young men also developed professionally with confidence. Unit party committee member Communist Repin also made a substantial labor contribution toward the fact that officers A. Voronov, V. Skachkov, A. Seleznev, and V. Shushin promptly became thoroughly broken in and oriented in the line unit. The squadron under his command was a socialist competition winner on numerous occasions. The subunit's aviators distinguished themselves in performing important training sorties, carrying on in a worthy manner the heroic traditions of their outfit's war veterans. For several years in a row the squadron has proudly borne the honorary title of excellent.

Recently Lieutenant Colonel Repin took command of another squadron. This brought added work and concern. And the missions assigned to this squadron proved to be more difficult. But this vanguard officer's goal remained the same: also to make this subunit, which in the not too distant past had been famed for its rich traditions, into one of the finest.

Personal example. How much it means in a commander's development, especially in present-day conditions, where aircraft systems designed for combat are highly complex and sophisticated. And this imposes on the one-man commander a great deal of responsibility for training and indoctrination of his men, and for their constant combat readiness. A great deal depends on the commander's qualities as an organizer and his ability fully to utilize the experience and capabilities of his deputies.

As we know, V. I. Lenin had harsh criticism for persons inclined to take on too much and finish nothing. He considered this quality to be contrary to the spirit of Bolshevik organization. Vladimir Il'ich stressed time and again that incoherence and the inability to concentrate on the main thing can bring any affair to naught.

There is a sure remedy to the problem of having a thousand things to do: it is to work persistently to develop in oneself composure, organization, the ability correctly to distribute one's work time in the interests of the job, and to see not only today but the future as well. Only then can one learn to carry out one's job-related duties without bustle or haste. Figuratively speaking, one should work at maximum output, without serious mistakes or errors.

On one of my trips on official business I became acquainted with officer V. Rassokhin. He was in command of an aviation regiment at the time. As a leader this individual has the ability to work innovatively, to think scientifically, and to be internally highly disciplined. But the main thing is the fact that he has the ability to evaluate his own actions with a

demanding measuring stick, from the position of party ethics, and he always follows the standards of Communist ethics and morality.

Officer Rassokhin graduated from a higher military aviation school for pilots, and subsequently successfully completed studies at the Air Force Academy imeni Yu. A. Gagarin. He has become type-rated on several different fighters. He has logged about 2,000 hours. For his distinguished service he was awarded the decoration For Service to the Homeland and the USSR Armed Forces, 3rd Class.

A strong-willed and firm commanding officer, relying on his assistants, the lower-echelon command personnel, he succeeded in transitioning his men over to a more sophisticated aircraft in short order and with good quality. Soon the regiment was the leader among the district's air forces, and subsequently for two years in a row was the initiator of socialist competition among aviation personnel of the Turkestan Military District.

I had a conversation with party member Rassokhin. He spoke warmly of his men and proudly listed the names of the socialist competition leaders. Among the finest he named officers V. Lugovkin, Yu. Antipov, V. Bogaditsa, and A. Zheleznyak, who knock out targets on the range with expert marksmanship. There are many aviation personnel in the regiment who by their selfless labor are building upon the fine fighting traditions and are devoting all their abilities and energy to the main goal -- to increase the unit's combat readiness.

It would seem that the commanding officer has nothing to worry about, since everything is proceeding in normal fashion. The regiment has been given a rating of excellent, and for 8 years now it has had no air mishaps. Personnel show a high degree of proficiency on the ground and in the air. Rassokhin refused to rest on his laurels, however, and evaluated his work performance in an exacting manner.

Today party member V. Rassokhin is working in a new job assignment. Frequently practical realities face a one-man commander with a test which not every individual could pass. In addition, aviation does not forgive the slightest miscalculations. It harshly punishes those who violate the rules governing flight activities. Failure to observe certain points of instructions and documents in organizing flight operations, for example, affects the success of scheduled training activities, diminishes the quality of training drills, and affects flight safety.

Aviation personnel remember well the error made by the crew of the helicopter piloted by officer V. Naumkin. It could have been avoided altogether if the crew members had all done their job correctly and had rigorously observed flight discipline. They caused financial loss with their incorrect actions and caused a lot of grief for their superiors. Naumkin and his subordinate were severely punished. And all this happened because the aviators forgot the well-known precept that the sky does not forgive mistakes.

An important role in successful combat training is played by conscientiousness, a high degree of sophistication in one's work, exceptional

efficiency, and continuous, constant self-improvement. At this point we must mention our famed pilots A. Pokryshkin, I. Kozhedub, M. Gromov, A. Smirnov, Ye. Savitskiy and many others! Their example is worthy of emulation, and their experience and know-how are unquestionably of use and benefit to those who today are helping the younger generation of aviators storm the skies.

There is no question about the fact that considerable changes have taken place in today's aviation in comparison with the past. Aircraft have become much more complex, and means of air traffic control have also experienced considerable changes. At the same time man's role has also grown, his responsibility for competent maintenance and operation of this equipment on the ground and in the air and for its efficient utilization taking into account its combat capabilities.

All this obliges each and every commander rigorously to observe the requirements of the corresponding guideline documents pertaining to combat and political training and to have the ability to foresee all possible complications in the training and indoctrination process and in the training of each aircrew. At the same time commander maturity mandatorily presupposes initiative for, as we know, the commander with initiative is first and foremost an individual with broad political knowledgeability, competent, trained and prepared for his job. He works with an eye to the future, with solid backup, and does not fear intelligent risk in the search for effective ways further to increase combat readiness, especially in performing suddenly arising combat training tasks and operations in an extreme situation.

Tough demands are imposed today on officers, leaders, and indoctrinators. They must be characterized by selfless devotion to the ideals of communism and the socialist homeland, a Leninist work style, thorough knowledge and skilled employment of weapons and combat equipment, strong organizer abilities, broad knowledgeability, broad scope of thinking, a sense of the new, and the ability to utilize socialist competition in full measure. Commanders should be distinguished by constant smartness of appearance, composure in the most difficult situation, businesslike efficiency, a strong feeling of responsibility for the state of affairs in their assigned area of responsibility, modesty, and closeness to their men. "Working with people," USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo, stressed in his speech at the Kremlin reception honoring new graduates of service academies, "is a great art, a complex and crucial matter. It does not tolerate excessive attention to form with consequent detriment to content, and it does not tolerate indifference. To lead a military collective means not only to command subordinates, to give them orders, but also to conduct systematic individual political, military, and moral/ethical indoctrination of personnel. One must be thoroughly familiar with the personal qualities, interests, and needs of each individual, and one must trust others and respect their dignity. Live contacts with personnel will help you find the correct path to their hearts. And he who possesses the soldier's heart possesses the secret of victory!"

Of course people's labor must always be judged on its merits. Refusing to rest on one's laurels, each and every achieved milestone in the campaign to increase the combat readiness of a subunit and unit should be considered not a

final achievement but merely another step, from which the ascent to new heights must begin. Here too an important role is played by the leader's professional knowledgeability and competence, his follow-through and ability to evaluate the state of affairs in the subunit or unit in a party-mindedly rigorous and objective manner.

At a get-together with constituents, CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, speaking about the leader's position of respect, stressed that respect is achieved by energy and knowledge, by personal example, and conduct, that the leader can be demanding on others because he is demanding most of all on himself. Very correctly noted and formidably stated.

Unquestionably the commander has a great many concerns, and he should have adequate time for all of them. He does not have the right to keep personally aloof from the conduct of training activities, for it is precisely at training drills, during flight operations, at seminars and discussions that the commander has the opportunity more deeply to study his men and more objectively to assess their accomplishments and shortcomings. One cannot ignore the influence which a skillfully conducted training class exerts on strengthening respect for the commander!

Methods conferences as a form of dissemination of the achievements of vanguard officers are utilized in many aviation regiments. At such conferences experienced subunit commanders discuss specific problems connected with training and indoctrination of subordinates, learn about valuable initiatives, and analyze the causes of the accomplishments and failures of their colleagues.

An important role in dissemination of such experience and know-how is played by political agencies, party committees, and party buros. Organizing a get-together between young officers and a combat veteran or military educator, preparing an interesting, instructive lecture, presentation of methods innovations and every possible assistance in achieving their practical adoption in the subunits -- all this unquestionably will be highly beneficial to officers in the area of further strengthening discipline, organization and increasing the level of vigilance and combat readiness of aircrews and squadrons.

3024
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AIRFIELD TECHNICAL SUPPORT ACTIVITIES CRITIQUED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 36-37

[Article, published under the heading "They Support Flight Operations," by Lt Col V. Kraskovskiy: "Highest Mark"]

[Text] "Regiment flight operations tomorrow...." The commanding officer always makes this statement with unconcealed pride, as if stressing the importance of the forthcoming flight operations shift for increasing the combat proficiency of aviation personnel.

Flight operations are an important test not only for flight, engineer, and technician personnel, but also for the men of the supporting subunits. A great deal depends on their professional expertise, efficiency, and quickness. For example, if a fuel truck driver is a few minutes later in servicing an aircraft on the flight line, the combat aircraft's turnaround procedures will be delayed, and this means a disruption in the rhythm of the flight operations shift.

As he listens to the regimental commander's presentation at the briefing, the commander of the aviation technical unit endeavors to gain a fuller picture of the events which will be taking place at the airfield on the following day. Precise knowledge of his job duties, spelled out in the various manuals and regulations, the nature of the forthcoming flight operations, and the specific features of the training activities to be performed by the aircrews enables him efficiently to influence the quality of support services provided for the flight operations day or night. Of course he is not acting alone, but together with his closest assistants and the subunit commanders. An important role here is played by correct placement of his men and their thorough preparation for airfield operations. An important place is also occupied by practice drills and instruction sessions conducted with personnel on the eve of flight operations, and rigorous checking of personnel performance readiness and state of equipment and facilities to be utilized in the flight operations.

On one occasion our specialists returned from the airfield with a mark of satisfactory. Naturally those men who were providing support to flight operations that day were cheerless and depressed, for many of them had worked conscientiously, putting out a full effort. A disturbing error in providing

support services to flight operations occurred because several individuals had arrived at the airfield late. Prior to departure of their vehicles from the motor pool, serious equipment malfunctions were discovered. It was ascertained that the previous day Sr Lt V. Chernyshev, duty officer for airfield technical support, had failed to inquire of the company commander whether everything was ready to provide support to aviator training activities.

This incident was an important lesson to all. We rigorously analyzed deficiencies at party and Komsomol meetings. They were also the subject of discussion at the next totaling up of training and socialist competition results. Appropriate conclusions were drawn.

At an enlarged meeting of the party buro, party members specified measures to mobilize Communists and all personnel for effective, efficient provision of support activities to flight operations and for exemplary servicing of airfield technical support equipment. A report was presented by party member A. Aksenenko. He thoroughly and self-critically analyzed mistakes and made a number of specific suggestions. He was backed up by other members of the party buro. Party member A. Shlychkov, for example, suggested that standard jet-engine starter units and fuel trucks be readied. Subsequently our top methods specialists used this equipment to conduct training classes with the young drivers, demonstrating how specialized equipment should be maintained.

Soon a serious discussion was held at a party meeting, on conscientious care of motor vehicles and a good-management attitude toward military property, particularly toward protective caps and covers which are part of the fuel tanker truck inventory. At times some specialists have an excessively casual attitude toward them, as a consequence of which they break down prematurely, and yet this could be completely avoided if each individual had a solicitous attitude toward military equipment, toward everything he has at his disposal. At the meeting party members resolved in the process of training subordinates not only to devote serious attention to improving their job skills but also to work persistently to instill in them a thrifty and conscientious attitude.

I particularly recall the words spoken by party members V. Biryukov and Yu. Shesternev, who spoke in a concerned manner about unutilized reserve potential, possibilities of improving the quality of flight operations support activities, and coefficients of improvement. The fact is that in order to ensure that each and every aviation rear services specialist works to the full extent of his ability, he must be taught to perform correctly and conscientiously his job-related duties as specified by documents governing and regulating mishap-free flight operations. A great deal here is determined by the commander's organizing role, his initiative, his ability to foresee and, if necessary, to call a subordinate strictly to account for negligence and sluggishness during servicing of a flight operations shift. There can be no compromises or lenience here, for we are dealing with flight operations -- an important test of combat proficiency. Flight operations test not only the job proficiency of rear services personnel but also their moral-psychological conditioning.

This is why we prepare for supporting flight operations with a strong feeling of responsibility. For example, we are now stricter about designating airfield technical support duty officers and their specialized training. We constantly bear in mind that the success of support activities also depends in large measure on an officer's determination, his thorough knowledge of tasks pertaining to the flight operations shift, and the capabilities of the equipment brought to the airfield. It is no secret that the men work hard and with a good deal of stress during flight operations. There are times when the airfield technical support duty officer barely has time to execute the incoming commands and scenario instructions. And not everybody is capable in such a situation of keeping his composure and directing with confidence and certitude the activities of the rear services specialists.

A challenge prize has been established for the purpose of providing moral incentive for the men in the unit to work harder. This prize is awarded to the best airfield technical support duty officer in a festive ceremony. It is awarded to that officer who received the highest mark for flight operations support, with all equipment and facilities working efficiently. Capt V. Svetlichnyy was named the competition winner in the first training period. Maj N. Doskovskiy, Capt Yu. Sikan, and Lt I. Vinogradov are also conscientious about their duties. They work with a great deal of inspiration and endeavor to ensure that the airfield and the entire aircraft fueling facility are maintained in an exemplary condition and operate flawlessly in the course of intensive flight operations shifts.

In connection with this I recall a recent tactical air exercise which was conducted in a complex tactical environment. The senior-level commander assigned personnel the following mission: to refuel a large number of aircraft flying in from another airfield, at night, within a short period of time. Our specialists successfully accomplished this important task. They worked conscientiously and selflessly on that dark, cold night, and they received the highest mark. Time and again combat aircraft would land at the airfield and would be able to take off again without the slightest delay, executing successful long-distance flights. The specialists of the fuel supply service had a big job to do, for they had to transfer tons of fuel into the tanks of each and every aircraft, and on a tight timetable. Nevertheless the men led by party member Yu. Sikan passed this tough test with flying colors. Many of them received commendations.

Of course the high mark did not come automatically. It was earned by hard work in classrooms and in intensive practice sessions. The service chief also unquestionably made a large contribution to the success. He was constantly in the thick of events, with his men, firing them with enthusiasm to do well by his own personal example. This had a beneficial effect on things and on the moral/ethical atmosphere in the outfit.

I should like to stress that we consider concern for the men, constant consideration of their interests and needs, and improvement of their living conditions and diet to be one of the main tasks accomplishment of which has a positive effect on overall performance results. And it is not surprising that our outfit received only two marks of good, with all other marks of excellent, for the job of servicing flight operations.

We recently put into operation an airfield technical support command post, which substantially improved personnel work effectiveness. A Lenin Room, a meal facility, and an airfield technical support duty officer room were set up in the building. The latter room contains a diagram of the airfield and the vehicle pool, boards displaying vehicle operation rules and regulations, display stands with excerpts from various documents, including the duties of the airfield technical support duty officer, basic requirements on ground servicing equipment and facilities, methods of checking and testing them, and aircraft towing procedures.

The airfield technical support command post has become not only the work station of the officer responsible for flight operations support but also a unique center for the conduct of party-political work. It has everything needed to accomplish this: nicely-prepared visual agitation displays, newspapers, magazines, and a good deal else.

It is also a pleasant experience to enter the Lenin Room, in which the following display stands have been lovingly prepared: "Lenin Is Our Banner," "The Party Is the Mind, Honor, and Conscience of Our Era!", as well as a display stand devoted to the party's reserves -- Komsomol. Regularly displayed on the socialist competition screen are the results of the work performance and competition performance of personnel taking part in flight operations support activities. Party activists and political workers frequently talk with the men here. If time allows, they present discussions and talk about the complex current international situation, about the aggressive aspirations of imperialist forces, headed by the United States, and on the tasks to be accomplished to achieve further increase in political vigilance and combat readiness.

Little time remains to the end of the training year. A decisive period in the flight training of aviation personnel has now commenced. We must work hard in order to obtain a high mark in the final performance evaluation. Aware of their great responsibility for exemplary flight operations support activities, our men are working very hard. They are filled with determination to complete the summer training period as well with a high mark, in order once again to emerge as victors in the socialist competition for an excellent-rated unit.

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LINK BETWEEN VISUAL HEIGHT ESTIMATE, POOR LANDINGS ANALYZED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 38-40

[Article, published under the heading "Flying and Psychology," by Military Pilot-Instructor 1st Class Lt Col N. Litvinchuk: "Runway Under the Aircraft"]

[Text] Having completed his assignment in the practice area, pilot cadet A. Antonov was bringing his fighter in for a landing. He was holding precisely on glidepath, and it appeared that the concluding phase of the training flight would be completed successfully. After rounding out, however, the aircraft sank to the concrete more slowly than usual. It touched down softly, but to the right of the runway centerline. The student was unable to keep the aircraft running straight ahead on rollout, and it ran off the concrete onto the dirt.

During the subsequent debriefing, Antonov was unable satisfactorily to explain the reason for his errors. The student pilot could not understand why such errors had occurred with procedures which seemed correct to him, when he could see that the aircraft was approaching the ground at the prescribed sink rate.

There is no doubt whatsoever that the faulty outcome resulted from error in receiving of information, which was also confirmed by the flight recorder tapes. As practical experience indicates, however, analysis of such errors, just as in the majority of other cases, should be performed on the basis not only of the flight recorder data and pilot actions, but also on the patterns and mechanisms of functioning of the "pilot-aircraft-environment" system. We shall endeavor to analyze the incident from this standpoint.

The photograph [not reproduced] shows the actual points of touchdown of aircraft in relation to the runway centerline. The axis of the geometric area of touchdown lies at an angle to the runway centerline. This indicates that the example under discussion is not an isolated one. There exists a definite relationship between such landing parameters as distance from runway threshold Delta Lx and lateral deviation from runway centerline Delta Lz. Analysis of this interlinkage should include the pilot's aircraft control actions and the dynamics of aircraft motion in relation to the environment, taking into account the latter's effect on the flight.

As we know, work pertaining to control includes receiving information, processing that information and making a decision, as well as actions taken to execute the decision. On a landing approach the pilot estimates height and maintains a specified rate of descent, heading, and reduces engine thrust and airspeed to landing configuration. In the case in question, when it seemed to student pilot Antonov that he had been proceeding correctly and had not experienced any difficulties in control, one can assume that the flight parameters were dependent on that information which he received in the first phase of his activity.

When executing a landing the principal information is visual. Determination of distance to the ground is based thereby on a certain psychological principle of estimating distance to objects from their angular dimensions and angular rate of displacement. Since visual perception of objects close to an aircraft is difficult due to their high angular rate of displacement, distance to the ground and change in that distance is subconsciously estimated according to the ground divergence "fan" and its angular rate of approach, as well as on the basis of the angular dimensions of objects in the zone in which they are clearly visible. Alongside other sources, the landing approach "fan" carries the most valuable information on height and its derivatives. The "fan" is the geometric location of objects during their displacement in the pilot's field of vision at angular velocities of more than 50 degrees per second (Figure 1). Other values of critical angular velocity of displacement of objects may be encountered in the literature.

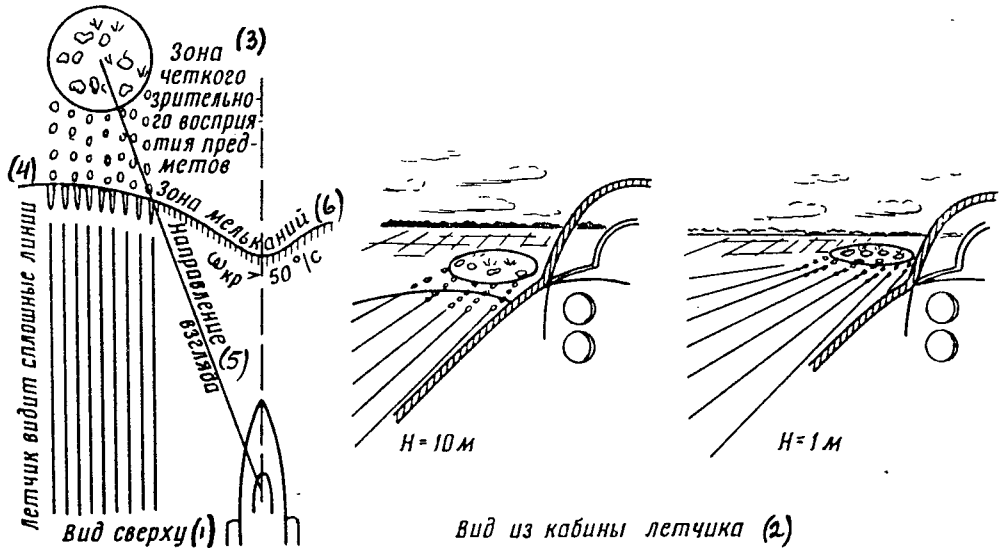

Figure 1. Ground divergence "fan".

Key: 1. View from above; 2. View from cockpit; 3. Zone of sharp visual perception of objects; 4. Pilot sees continuous lines; 5. Direction of gaze; 6. Zone of flickering

Proceeding from the position that the "fan" should continuously occupy the pilot's field of vision, without moving under the aircraft, with the aid of Figure 2 we can find expressions which define the optimal direction of gaze during the landing approach from the standpoint of receiving visual information on height and its derivatives: angle of direction of gaze

$$(1)\quad \delta^\circ = \arcsin\left(\frac{l}{L}\right), \qquad (1)$$

where

$$l = h \cdot \operatorname{tg}\left[\frac{90^\circ + \varepsilon}{2}\right]$$

distance viewed at an angle of 90 degrees + epsilon/2 from the aircraft; h -- height of pilot's eyes above the ground surface; epsilon -- angle of zone under the aircraft not swept by pilot's gaze and distance to ground surface

$$L = \sqrt{l^2 + [d + (0{,}1 \div 0{,}2)\, V_к]^2}, \quad [м], \quad (2)$$

where d -- distance to edge of zone of "flickering" (with omega > or = 50 degrees per second) from point A to point B; (0.1-0.2)Vk -- distance traveled by an object in the time required for its visual perception; Vk -- aircraft ground speed.

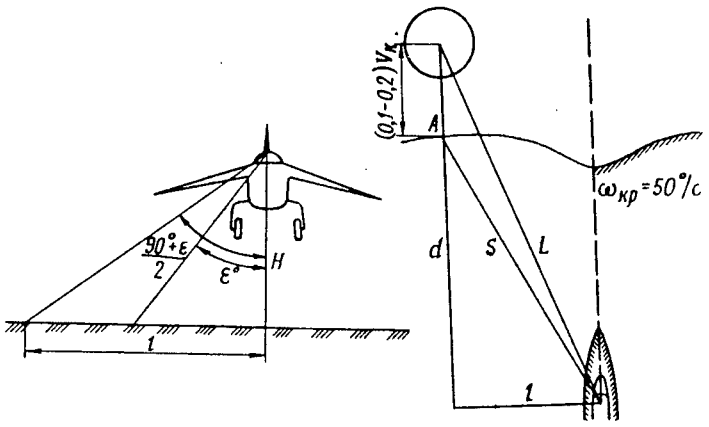

Figure 2. Determination of pilot's direction of gaze on landing approach

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Direction of pilot's gaze on landing approach calculated in this manner virtually coincides with that which was selected on the basis of flying experience and recommended in instruction manuals to the pilots of aircraft of specific types. As the formulas indicate, however, the calculated optimal direction of gaze, in contrast to the recommended direction, depends on the flight parameters. In addition, the point where the pilot's gaze is directed

is linked to the left edge of the runway. In this case, during aircraft movement along the runway centerline I=Zrnw/2, that is, equal to half the runway width.

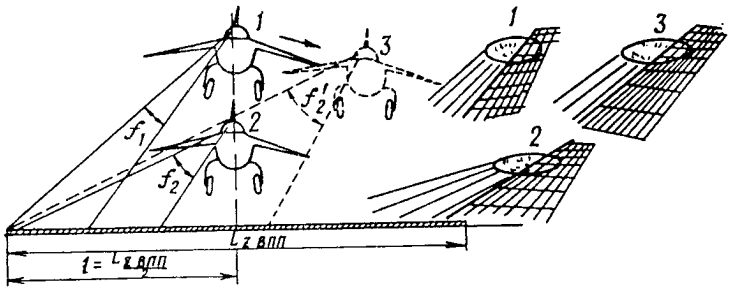

Figure 3. Estimate of sink rate based on ground divergence "fan".

It is evident in Figure 3 that change in sighting angle on "fan" line f indicates change in height (presence of rate of descent Vy):

$$f' \approx \frac{\Delta f}{\Delta t} = \frac{\operatorname{arctg}\frac{l}{h \pm V_y \Delta t} - \operatorname{arctg}\frac{l}{h}}{\Delta t}. \quad (3)$$

With a decrease in height these lines, which proceed from the point where the pilot's gaze is directed, run toward the horizon, and when it is increasing -- toward the aircraft, into the zone unobserved by the pilot. It is evident in this same diagram that the angle will also change with the presence of lateral displacement: W=Vk sinYCk.

$$f'_1 \approx \frac{\Delta f}{\Delta t} = \frac{\operatorname{arctg}\frac{l \pm W\Delta t}{h \pm V_y \Delta t} - \operatorname{arctg}\frac{l}{h}}{\Delta t}. \quad (4)$$

In order to ensure the prescribed sink rate and the second derivative of height, it is sufficient for the pilot to maintain during the landing approach constant value f', which he commits to memory when working on this maneuver. Therefore from the standpoint of perception expressions (3) and (4) can be considered equivalent.

In connection with the fact that in the case under discussion the parameters of aircraft motion are affected by the information perceived by the pilot, we shall not consider the matter of aircraft control and dynamics of aircraft motion. With the aid of expressions (3) and (4) we shall proceed to the actual parameters of aircraft motion relative to the ground surface:

$$l(V_{yp} - V_{y\phi}) \pm hW \pm WV_{yp} \cdot \Delta t = 0. \quad (5)$$

where Vyp -- sink rate corresponding to the calculated value f'p without lateral displacement; Vyf=actual sink rate.

Assuming that Delta t tends to 0, and discarding that part of the expression containing this value, we find:

$$V_{y\Phi} = V_{yp} \pm \kappa W, [м/с]; \quad (6)$$

$$t_{выд.\Phi} = \frac{H_1}{V_{y\Phi}} = \frac{H_1}{V_{yp} \pm \kappa W}, [с]; \quad (7)$$

$$\Delta L_{x\Phi} = V_{к.ср}\, t_{выд.\Phi} \cos УС_к =$$

$$= V_{к.ср} \cos УС_к \frac{H_1}{V_{yp} \pm \kappa W}, \quad [м]; \quad (8)$$

$$\Delta Lz_\Phi = V_{к.ср}\, t_{выд.\Phi} \sin УС_к \approx$$

$$\approx W \frac{H_1}{V_{yp} \pm \kappa W}, [м]; \quad (9)$$

$$V_{yp} = \frac{H_1 V_{к.ср}}{\Delta L_{xp}} = \frac{H_1 V_{к.ср}}{200}, [м/с], \quad (10)$$

where $\kappa = \frac{h}{l} = 1/\mathrm{tg}\left[\frac{90^\circ + \varepsilon}{2}\right]$;

t vyd.f -- actual time aircraft is held off after flaring; H1 -- height after flare -- Delta Lxp, Delta Lzf, Delta Lxf -- calculated (for f'p) values and actual coordinates of points of touchdown in relation to the runway threshold and its centerline, which as an aggregate form the geometric touchdown area.

From expressions (6)-(9) one can conclude that with a slip left (+W) the aircraft will touch down left of the runway centerline, with failure to reach T, since Delta Lxf is less than Delta Lxp. Sink rate and load factor ny on final approach increase. With a slip right, sink rate decreases and even reverses, that is, the aircraft floats, especially after flaring. Holdoff time, Delta Lxf and Delta Lzf increase accordingly, and the aircraft may even drift right until it is beyond the runway edge. All this is confirmed by the photograph of the runway and practical flying experience, which indicates that landing on the right side of the runway occurs as a rule with a soft touchdown long, and on the left side with a hard touchdown short.

These conclusions are of considerable practical significance, especially for tower controllers, who are unable, with their view from the side, directly to determine how an aircraft is moving relative to the runway and to predict the point of touchdown relative to the centerline, that is, lateral displacement. In this instance a long float after roundoff, including a rise, is for the tower operator an indication that the landing aircraft has touched down to the right of the runway centerline, and he should draw the pilot's attention to holding direction. A fast dropout after flare, and sometimes a hard landing,

indicates touchdown left of the centerline. On the other hand this is also important information for the pilot. When directing his gaze left, if the aircraft continues to float long after roundout, he must check aircraft direction of travel, etc.

Angular rate of ground approach omega, according to which the pilot also visually estimates height, and especially height at end of roundout H1, is determined by ground speed Vk and height of pilot's eyes above ground surface h.

A difference in actual groundspeed from that at which height estimation skills were practiced leads to distortions in height perception due to change in omega at the calculated height.

Since the angular rate of ground approach is connected with a terrestrial coordinate system, while flying is done in relation to airspeed, that is, indicated airspeed, change in air density as well as wind direction and velocity will affect the estimate of distance to ground.

For example, if estimating height was practiced in no-wind conditions with Vnp=300 km/h and h=3.5 m (H1=1 m), with a headwind of 10 m/s the pilot will try to complete his roundout at h=3.08 m (H1=0.58 m), and with a 10 m/s tailwind -- at h=3.92 m (H1=1.42 m), which is in fact observed in practice.

The simplest method of eliminating errors of perception with a headwind (as a rule landing approaches involve such conditions) is to bring the aircraft to initiation of roundout with excessive airspeed, equal to wind velocity at the given height. This also promotes accuracy of landing approach calculation and consideration of other factors connected with the effect of wind.

It was stated above that in addition to maintaining the specified parameters, on his landing approach the pilot also reduces engine power and airspeed to touchdown speed and maintains runway heading. The predetermined rate at which airspeed is decreased is secured by the rate at which the engine is throttled back and the holdoff time (sink rate). If actual time t vyd.f fails to correspond to the calculated time, all other conditions being equal, speed at touchdown will not correspond to calculated speed.

Estimate of maintaining runway heading is optimal when using the three points method, when the pilot can hold the aircraft on a straight line: runway centerline at far end, threshold end, and pilot's eye. But this is possible only when the pilot looks forward through the windshield along the aircraft longitudinal axis. Experiments indicate that many pilots land precisely looking in this direction, and therefore one can assume the existence of two standard deviation ellipses, one of which lies along the runway centerline and the other at an angle to it (Figure 4). These two ellipses form the touchdown area, which is shown in the photograph [photo not reproduced].

When the pilot looks forward, however, accuracy in estimating height and its derivatives diminishes, especially with a rapid change in pitch angle, which can be perceived as an abrupt change in height and lead to gross pilot landing errors (Figure 5). The instructor teaches the student pilot to direct his

gaze on landing approach in such a manner or to switch his attention so that his estimate of the required flight parameters is optimal according the degree of their importance.

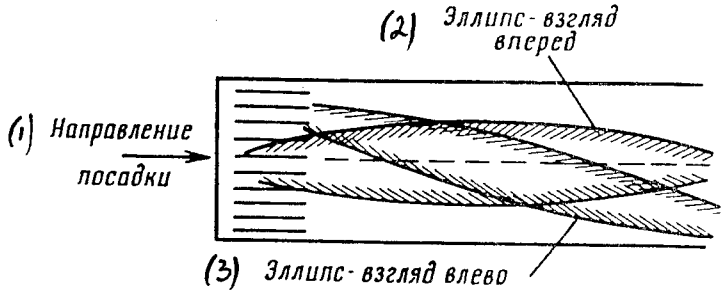

Figure 4. Geometric aircraft touchdown area.

Key: 1. Direction of landing; 2. Ellipse-gaze forward; 3. Ellipse-gaze left

Figure 5. Errors in perceiving height with a rapid change in pitch angle.

Key: 1. Apparent aircraft position with rapid change in pitch angle; 2. Aircraft's actual position

Thus the cause of the mishap-predisposing situation experienced by pilot cadet Antonov consists in inadequate attention during the landing procedure and, to a certain degree, incorrect receiving of information on the landing parameters. A more detailed investigation indicates that other factors can also lead to such errors, in particular pilot fatigue, deficiencies in learning to distribute and switch attention, peculiarity in the design of an aircraft's cockpit and nose section, runway markings, as well as peculiarities in the pilot's aircraft control actions. The latter consist in the fact that in pulling the stick back the pilot may pull the stick slightly on a diagonal to the right, at the same time applying right rudder, which in the final analysis causes the aircraft to drift right. Heavy aircraft with control yokes as opposed to sticks are also susceptible to this, although to a lesser degree.

We have presented here an example of a systems approach to analysis of a potential accident situation. In general such an approach is grounded on the combined application of sciences which investigate the functioning of individual parts of the "pilot-air-environment" system: general and engineering psychology, aerodynamics of flight, piloting procedures, operation and functioning of aircraft and powerplant systems, plus others. The aggregate of these sciences provides the capability to determine an aircraft's parameters of motion according to predetermined pilot procedures; required pilot procedures according to specified aircraft parameters of motion; an optimum in aircraft parameters of motion and pilot procedures.

Utilization of an aggregate of sciences to study the patterns and mechanisms of movement of the "pilot-aircraft-environment" system beyond the boundaries of the proper operating configuration under the effect of various factors (individual and group) can produce good results in the search for causes of faulty actions by flight personnel and, consequently, also in training of aviation personnel and further development of theory of flight safety.

3024
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RMI SIMULATOR USED IN CLASSROOM ADF INSTRUMENT APPROACH INSTRUCTION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) p 41

[Article, published under the heading "The Reader Suggests," by Candidate of Military Sciences Lt Col Yu. Kochegarov: "Navigation Training Simulator"]

[Text] Difficult skills to learn during basic training at pilot schools include bringing the aircraft onto the prescribed courseline (LZP), tracking to or from a nondirectional beacon/compass locator, and the landing approach. A navigation training simulator was designed and built in the navigation department at the Borisoglebsk Higher Military Aviation School for Pilots imeni V. P. Chkalov in order to facilitate the process of teaching pilots these skills. It is designed for practicing skills in utilizing an angle-measuring or azimuthal system. The simulator provides the capability efficiently to teach student pilots to determine navigation elements in tracking inbound to and outbound from a station using the automatic direction finder (ADF) and magnetic compass, and also helps them master the technique of correcting errors on landing approach. With the aid of this simulator one can graphically show an aircraft's position relative to the courseline on the basis of UGR [RMI -- radio magnetic indicator] readings.

The navigation simulator comprises a large-format working UGR-1 instrument, built on a scale of 6:1, and an aircraft model with two built-in selsyn transmitters (Figure 1). It is placed next to a classroom blackboard, on which the instructor, depending on the conditions of the assignment, draws the selected courseline or the landing approach courseline with compass locator and runway. The compass locator is attached with an ordinary suction cup, across which runs a weighted fishing line, which records bearing to station.

In considering a "flight" to or from the compass locator, the instructor gives the students the aircraft's position in relation to the selected courseline, in conformity with the conditions of the problem. The students at the same time observe the RMI readings. The instructor demonstrates calculation of course correction and the pilot's actions when moving onto the courseline by maneuvering the aircraft, with synchronous display of aircraft heading and compass locator relative bearing (KUR) on the RMI.

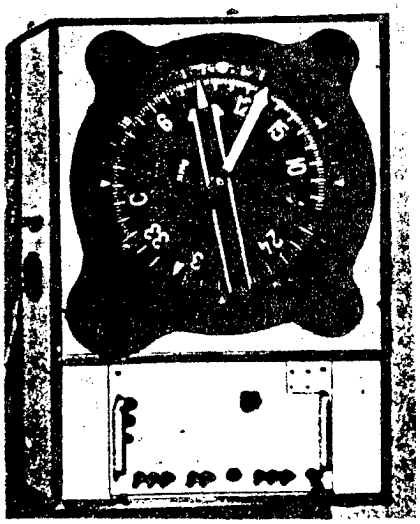

Figure 1.

When "shooting an approach" with the aid of the navigation training simulator, one can see the flight dynamics in a horizontal plane, evaluate the pilot's errors, and determine the procedure for correcting them inbound prior to "passage" of the outer compass locator.

The large-format working UGR-1 instrument is coupled to a power supply and converter. The bearing indicator card and KUR pointer are controlled by selsynlinkages via servo amplifiers loaded by type DG-1TA motor-generators (Figure 2).

The heading and relative bearing transmitting selsyns are mounted in the aircraft model. Simulation of heading is accomplished by turning the heading selsyn transmitter rotor axis to an angle measured relative to a north-south direction, which is defined by a plumb bob (weight) on the selsyn shaft crank, while simulation of relative bearing is accomplished by turning the shaft of the KUR selsyn transmitter in the model via a line-connected crank from the compass locator model. The heading and relative bearing servo system circuits are similar and differ only in degree of reduction.

When there is a mismatch between selsyn transmitters and selsyn receivers, an error signal is applied from the selsyn receiver rotor to the solid-state amplifier input, input voltage across which is applied to the DG-1TA motor-generator. It turns the selsyn transmitter shaft and instrument card to zero error. At the same time a tachosignal is taken from the generator part of the DG-1TA to damp servo system self-oscillations.

The unit employs type A-8 selsyns, type DG-1TA motor-generators, and standard 542 SB solid-state aircraft instrument amplifiers, slightly modified for this

circuitry. The training simulator is powered from a 220 volt, 50cycle AC power line, 80 watt power requirements. The power supply provides 26 volts to the converter and amplifiers and 36 volts at 400 cycles to the motors. A PAG-1F converter is used as three-phase source. The unit contains output terminals for connecting additional loads, which can be used in training and laboratory activities.

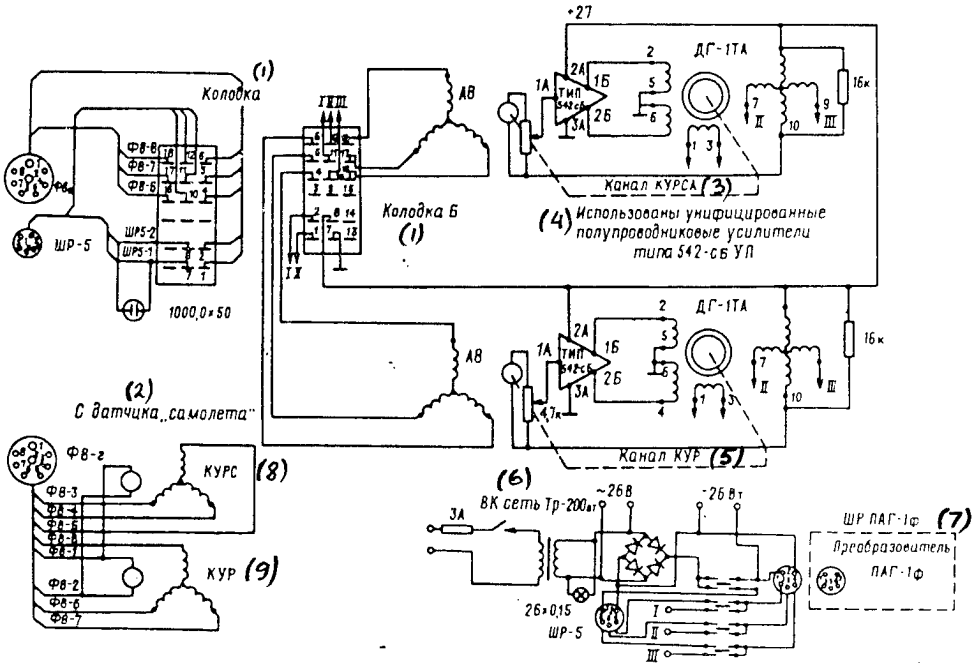

Figure 2.

Key: 1. Terminal block; 2. From "aircraft" transmitter; 3. Heading channel; 4. Type 542-SB UP standardized solid-state amplifiers used; 5. Relative bearing channel; 6. Power line switch; 7. Converter; 8. Heading; 9. Relative bearing

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Employment of this navigation simulator during a lecture makes it possible to eliminate a large number of diagrams depicting an aircraft's position relative to a selected courseline, provides a more graphic presentation of the material, and reduces by approximately 20 percent the time allocated for study of methods of correcting errors on approach inbound. In group training classes, following analytical solution to problems on determining navigation elements (courseline track error, heading adjustment, drift angle), it graphically shows the solution. This helps the pilot cadets thoroughly assimilate material on using the radio magnetic indicator.

As experience has shown, employment of a navigation simulator in the training process substantially reduces student time and effort in mastering specific topics. I believe it will be of interest not only to specialists at Air Forces higher educational institutions but also line unit pilots flying RMI equipped aircraft.

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U.S. MILITARY-INDUSTRIAL COMPLEX RAKED OVER COALS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 42-43

[Article, published under the heading "Imperialism -- Enemy of Peoples," by A. Sergunin: "Death Merchants Lobby"; based on materials in the foreign press]

[Text] In the United States one can hear about a "Soviet military threat" from the lips of officials, in radio and TV broadcasts, and one can read about it on the pages of magazines and newspapers. This notorious bugbear is used by the militarists as a pretext for an unchecked arms race. The Pentagon budget has reached incredible proportions, while draft proposals to increase it over the coming 5 years are truly fantastic. The schemes of the Washington strategists call for sacrificing on the "alter of madness" 323 billion dollars in 1985, 357 billion in 1986, 388 billion in 1987, and 425 billion in 1988.

Implementation of grandiose programs to upgrade nuclear missile potential, naval forces, and conventional arms in the United States is in full swing. Who derives benefit from this war psychosis? The answer is unequivocal: the military-industrial complex (VPK).

The bosses of military business have many ways of influencing government policy. One of them is to place their own people in the White House and in the departments and agencies responsible for drafting defense and foreign-policy programs. Securing for itself the appropriate influence in the corridors of power, a given company supplies personnel for alternating administrations in office. In actual fact the arms corporations "post" their people to Washington for a specified period of time, where they seek by hook or crook to obtain additional contracts for their patrons, and subsequently return "home." U.S. journalists have christened this phenomenon the "revolving door" principle. In this continuous cycle government power coalesces with monopoly capital.

This method, utilized by the bosses of the military-industrial complex to secure their own interests, is known under the more general name "lobbyism" (the word "lobbi" is an English word meaning "corridor," "lobby"). The monopolies hire special persons -- lobbyists, who push through the corridors of power decisions sought by their bosses.

Congress is the main target of lobbyists' attention in the United States. Influencing congressmen begins at some distance, from that moment when a person has announced his candidacy for Congress. As a rule he is in great need of funds: it costs hundreds of thousands and sometimes even millions of dollars today to become elected to the Senate or House of Representatives. Corporations form so-called political action committees for the purpose of financing and organizing assistance to their proteges. The amount of contributions to his campaign and consequently election victory as well depend on how obedient a candidate is. The bosses of the military-industrial complex also take advantage of this, virtually buying politicians. According to the public-interest organization Congress Watch, in 1983 political-action committees of the major corporations contributed 21.9 million dollars to legislator campaign funds. It is quite obvious that legislators who are financially supported by the military-industrial complex serve their masters faithfully.

But if lobbyists are unsuccessful in attempts to slip a bribe to a future legislator during the election campaign (as a rule in the form of a fee for lectures, articles, consultation), a well-honed system of threats, blackmail, persecution, and "arm twisting" is brought into play. A member of Congress is literally flooded with letters, telegrams and telephone calls from the voters of his district or state, expressing displeasure with his actions. It is no trouble whatsoever for lobbyists to organize such a campaign, using local agents. Not only the rank-and-file voters are enlisted in such an operation but also those whose opinion a person on Capitol Hill simply does not dare ignore -- local businessmen and politicians. If it becomes necessary, lobbyists do not hesitate to intrude into a legislator's personal life, influencing him through personal friends, relatives, and utilizing information about his financial affairs, amorous escapades, etc.

But if a member of Congress is obedient, he has it made. He need not be concerned about his political career. His pockets are always filled with money. The monopolies are quite generous with funds for lobbying: in 1983 lobbying expenditures per legislator amounted to 73,527 dollars, that is, more than the annual salary of a member of Congress. All expenditures are recouped.

Ties between the military-industrial complex and the Reagan Administration are particularly evident. Stooges of the military-industrial complex in the U.S. Government feel right at home under the 40th President of the Untied States. West Coast arms corporations, to which Reagan owes his election in large measure, are especially influential. He was cultivated as a politician by the California monopoly General Electric, with which he has been connected since the 1950's. The Bechtel Group, which is involved in military construction projects both in the United States and abroad, enjoys enormous influence with the current Administration. Since former Bechtel officials hold high positions in the Administration, this has given rise to biting comments that practically the entirety of U.S. foreign policy has been placed under the control of this California company. The Zionists are especially unhappy with the actions by its stooges in the government. They charge the corporation with influencing the Administration to cooperate not only with Israel but also

with Arab reactionary forces, since Bechtel has considerable business interests in the Arab world.

Incidentally, not only Bechtel but also other monopolies within the military-industrial complex are accused of "pro-Arab sympathies." Heeding the desires of the "death merchants," Reagan endeavored to guide relations with the pro-Western Arab regimes into a path of militarism and expanded U.S. arms deliveries to these countries. To the displeasure of the Zionists and in spite of fierce resistance on the part of the pro-Israeli coalition in Congress, the President made the decision to sell to Saudi Arabia the modern AWACS early detection and warning system.

Of course this bickering is nothing but a smoke screen. The fact that the alliance between the Reagan Administration and the Zionists is solid is proven by Washington's enormous military-economic and political aid to Israel, as well as outright U.S. armed intervention into Lebanese affairs on the side of Tel Aviv. Often actions undertaken by Reagan to "restrain" the aggressor would be of a demagogic, propaganda nature and be merely for the purpose of concealing the true aims of U.S. imperialism. As regards arms deliveries to conservative Arab countries, the Zionists themselves understand full well that their primary purpose is to crush the revolutionary movement both at home and abroad, not to counter Israeli expansion.

Among the military monopolies of the U.S. West, the aerospace corporations are especially aggressively seeking power, and this is understandable. Government contracts bring them truly astronomical profits, since the systems they develop are extremely costly. And it is easier to foist this waste on society as a whole if you have "your own people" in the government.

Northrop, which builds military aircraft, obtained contracts to produce the guidance systems for the MX intercontinental missiles and electronic gear for the B-1B strategic bomber and F-18 fighter. Often in developing a weapon system the company operates at its own financial risk, and subsequently obtains from the government contracts to manufacture it. For example, the corporation spent almost a billion dollars on development and production of the F-20 Tiger Shark fighter, and now is trying to force this aircraft not only on the U.S. Air Force but also on Egypt, South Korea, Saudi Arabia, Oman, and other countries. The F-20 is a multirole tactical fighter developed specifically for export to developing countries to replace the aging F-5E.

Boeing, an aerospace corporation, has also pushed many of its officials through the "revolving door" into key positions in the Reagan Administration. Upon leaving the company for government, they were paid unusually high "terminal bonuses" -- a clear reminder not to forget their employers. And naturally this "reminder" had an effect. The Reagan Administration reactivated the program to build a fleet of B-1 strategic bombers. The corporation was awarded a contract to build Minuteman intercontinental missiles and SRAM air-to-ground missiles. It is taking part in development of the newest first-strike strategic missile, the MX, and in the Space Shuttle project, and is supplying principal electronic surveillance components for the AWACS aircraft.

A fierce competitive struggle is in progress among the aircraft companies over military export, which has reached enormous dimensions -- several billion dollars a year. They have plenty of foreign orders for their lethal wares: the militarists of various countries are seeking to acquire first and foremost missiles and aircraft which are first-strike weapons. Exports are extremely important for the U.S. aircraft companies from the standpoint of expanding the market for their goods, for increasing production and, in the final analysis, for generating additional superprofits.

Of course the monopolies are making full use of their stooges in government in order to push through favorable decisions.

Frequently the military monopolies get their agents into the government, utilizing various political organizations and so-called "brain trusts" of a militarist nature. These organizations engender doctrines favorable to U.S. imperialism and train personnel to implement these doctrines. The Committee on the Present Danger, for example, established in 1976, has become the principal supplier of personnel in the foreign-policy area to the Reagan Administration. The committee advanced the platform of "total rearming of America," restoration of the allegedly shifted balance of power between the USSR and the United States, thwarting of arms limitation talks, and direct confrontation with the socialist nations. Approximately 50 former committee members, including Reagan himself, have taken top-echelon positions in the White House, State Department, Pentagon, and CIA.

The powerful clan of U.S. military-industrial corporations and their stooges in government, who are leading the country along a ruinous course, are called "spawn of the devil" and "lobbyists of catastrophe." They would have long ago pulled mankind into the abyss of nuclear war if it were not for the peace-seeking activities of the Soviet Union, the other socialist nations and all progressive forces throughout the world, if it were not for our mighty Armed Forces -- bulwark of peace and security of peoples.

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CRIMEAN RADIO TELESCOPE DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 44-45

[Article, published under the heading "Responding to Readers' Questions," by Candidate of Technical Sciences Col V. Gor'kov: "Crimean Radio Telescope"]

> [Text] Our readers request information about the Crimean radio telescope which took part in receiving information from the Venera 15 and Venera 16 unmanned interplanetary probes. Our special correspondent responds to their request.

The elements were raging in the southern part of this country in November 1981. Hurricane-force winds, three days of snowfall, again followed by high winds. The roofs of many buildings were blown off. Trees and telegraph poles were toppled. The Black Sea raged to such an extent that the community of Pribrezhnyy near Yevpatoriya became inundated and for several days looked a great deal like Venice. A general cargo carrier was blown aground not far from the docks....

I saw signs of the storm along the road to the Long-Range Space Communications Center, where operations with the Venera 13 and Venera 14 unmanned probes were being planned and scheduled at that time, unmanned vehicles which were to transmit a panorama of the surface of the mysterious planet Venus. "Did they manage to ride out the storm?" I thought to myself nervously. Imagine the cost of the antenna alone of the RT-70 radio telescope! It is larger in area than a soccer field. When deployed, the monster presents to the wind a much greater area than that of the freighter lying grounded offshore. How strong must the antenna be?

I spotted from a distance an enormous, blindingly white dish rising above the steppe. The closer I got, the better I could see that its elegant structure was safe and sound.

Suddenly the alarming wail of a siren reverberated above the steppe. This was a warning for everybody to be alert, that this 4,000-ton giant was about to spring to life! The siren may have truly alarmed some people, but I was overjoyed: the antenna was undamaged! The intelligence of the designers, the precise accuracy of the engineering calculations, the conscientious labor of

the erecting crews and the courage of the people who operate and service it had defeated the elements.

Indeed. A few minutes later the antenna, submitting to the program fed by an operator, smoothly and easily proceeded into motion. After some time it once again came to a halt and froze in position. The stereotyped notion that an antenna, picking up a signal, aims at a specified point in the sky would be erroneous in this instance. It was in fact moving to follow a source of information, but only a computer can record this motion.

The Crimean radio telescope (see back cover) [photo not reproduced] was designed and built by many work teams, under the overall direction of M. Ryazanskiy. The RT-70 is unequalled anywhere in the world in diversity of operating modes, sharpness of "vision," number of frequency bands, ability to shift from one to another virtually instantaneously, as well as in stability of principal performance characteristics. Its designers solved a broad range of electronic, design, engineering, and construction problems. Taking a certain amount of technical risk, they succeeded in obtaining an unusually felicitous combination of design and electronic engineering solutions. At the same time the experts made sure to design multirole capability into the antenna, which can be used for communications with interplanetary probes, can be used as the principal component of a radio telescope capable of investigating the most distant objects in the universe, or can be a radar for probing the planets.

The antenna consists of three basic components, as it were: a reinforced-concrete tower-base 16 meters tall, a traversing platform, and the antenna dish system. The tower-base takes the load via a conventional ball-bearing arrangement. It is true that it can be called conventional only in design principle. It is unique in size: 300 16-kilogram "balls" roll between two races 22 meters in diameter. The lower race is secured to the base, which is level to an accuracy of plus or minus 0.1 mm, while the upper race is secured to the traversing platform. This bearing assembly, together with a pinion traversing system, rotates the antenna in a horizontal plane.

The traversing platform is a complex structure, consisting essentially of a gear quadrant which turns on trunnions in two horizontal axis bearings, and the main dish counterweights. It is set in motion by electric drives, which respond to a computer-fed digital control code. The drive system is powerful enough to ensure normal antenna operation with wind velocities up to 18-20 meters per second.

The third part of the antenna -- the dish system -- is attached to the traversing platform. The open-work frame of the main antenna dish is fabricated of a large number of tubular steel members. 1,188 aluminum plates, forming the dish, are mounted on adjustable pins attached to the frame. This made it possible to mount the reflector dish, in the form of 14 concentric circles, with the required accuracy. The 7-meter diameter retroflective dish and its motion drive (for antenna frame compensation) are mounted on a four-column support. Located at the center of the dish is a large conical structure, a capsule holding containers with removable receiving and transmitting equipment. Mounted above this structure is the antenna dish

turning system. It is this which accomplishes rapid change in receiving and transmitting frequency bands.

Stability of space communications is achieved when the dimensions of the main antenna dish are hundreds and even thousands of times the radio wavelength. If one considers that the waveband ranges from 3 to 40 centimeters, it becomes clear how massive the antenna must be. And this leads to difficulties.

The quality of any antenna is estimated by its utilization factor, which is determined by the shape of the main dish and imperfections in its manufacture, the quality of its feed, and the degree of shadowing of the dish by the retroflective reflector mount. Until quite recently it ran 0.5-0.6. This means that at best 40-50 percent of the dish area is lost for all practical purposes. As a result, when building an antenna 60 meters in diameter, one actually obtains about 45 meters. It seems a shame to waste all that metal and energy. In addition, as reflector diameter increases, there is a concomitant increase in construction time and antenna cost.

USSR Academy of Sciences Corresponding Member L. Bakhrakh made a considerable contribution toward solving this problem. He suggested substituting a quasi-parabolic dish for the traditional parabolic shape of the main dish. This reflector shape helps achieve a more uniform illumination of the dish surface. Feed energy is also almost fully utilized. If it were not for shadowing from the retroflective dish supports and imperfections of dish manufacture, the utilization factor for the surface of a quasiparabolic antenna would be close to 1. The new dish configuration was first incorporated in satellite communications antennas, in particular in Intervideniye system ground stations.

Another problem inevitably arises with an increase in dish diameter: the problem of deformations. The dimensions of deformations increase in proportion to the square of the diameter of the dish. Deformation in a 70-meter antenna, for example, is 8 times that of a 25-meter antenna, amounting to 3-4 cm. This is where difficulties begin. Irregularities of shape should not exceed one tenth wavelength. Therefore the waveband for working purposes narrows to 30-40 cm. A solution to this seemingly hopeless situation was also found.

Soviet radio telescope designer P. Kalachev and German designer S. von Horner, working independently of one another, both proposed an idea which boiled down to the following. Since it is impossible to avoid deformation, why not try to utilize the new dish shape efficiently, planning shape change in the process of design? Combining displacement of retroflective dish and feed in relation to deformation, one can obtained the required ray diagram. Subsequently, during design of the RT-70 antenna, the principle of distribution of deformation along a surface of any given shape for a two-reflector system was determined, that is, a solution is a general form was found. As a result the antenna utilization factor was boosted to 0.8.

The radio telescope was tested in December 1978 during communication with Venera 11 and Venera 12. At that time, thanks to its sensitivity, scientists were able to determine the parameters of motion of the Venus landers in the

planet's atmosphere. Many space, radio-astronomy and radar investigations have been conducted since that time, in which qualitatively new results have been obtained with the aid of the RT-70.

In various frequency bands the Crimean radio telescope is 10-35 times as sensitive to signals received from unmanned interplanetary probes (AMS) than other Soviet long-range space communications facilities. The rate of receiving of scientific data transmitted by an unmanned interplanetary probe is many times faster. This is especially important for exploring Venus: vehicle descent time to the Venusian surface is measured in hours. It was the capabilities of the Crimean radio telescope which made it possible to receive a color panoramic photographic image of the surface of Venus in 1981 and data on radar imaging of the planet's surface by equipment on board the Venera 15 and Venera 16 probes in 1983.

Soviet scientists have obtained interesting results from radar measurements of the planets. Measurements of interplanetary distances performed with the Crimean radio telescope formed the basis of relativist theory of motion of the inner planets (Mercury, Venus, Earth, and Mars). It is based on the general theory of relativity, which takes into account changes in temporal and spatial relations in gravitational fields and utilizes both the most recent optical and radar measurements. It produces astounding results: it enables one to predict the motion of these planets from 50 to 100 times more accurately than the conventional method. This is a very important advance. Ballisticians have been provided with a highly sophisticated tool for computing interplanetary spacecraft trajectories. The RT-70 antenna has provided the capability to see the topography of the closest planets with a ranging resolution to 1.2 km. In particular, the profile of Mons Olympus on Mars, which has a maximum elevation of 17.5 km, has been determined.

This telescope has enabled radio astronomers to record weak cosmic radio emissions and to study their spectrum in a previously inaccessible frequency band -- 1.35 and 0.8 cm. Precisely these frequencies bear important information on the structure and motion of molecular clouds containing star-forming centers, on processes taking place in the cores of galaxies, and on certain objects in the universe which are moving apart faster than the speed of light.

Radio astronomers, building upon the experience of their predecessors, for the purpose of achieving higher resolution began "consolidating" radio telescopes into radiointerferometers with a baseline practically equal to the Earth's diameter. Such an antenna duet makes it possible to achieve a resolution of 1/1000 of a second, which is 20 times better than that of the largest optical telescope. And in 1979 Soviet scientists built the world's first space radiointerferometer, which included the RT-70 and the KRT-10 carried on board the Salyut 6 orbital station.

These are some of the first, in a number of instances record achievements by Soviet scientists working with the RT-70. As any new and sophisticated tool, it has not yet fully revealed its capabilities, and we unquestionably shall in

the future witness new space accomplishments involving utilization of the Crimean radio telescope.

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BIRTH OF SOVIET SPACE PROGRAM TELEMETRY FACILITIES SKETCHED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 46-47

[Article, published under the heading "History of the Space Program," by Candidate of Technical Sciences G. Smirnov: "Engendered by Space"]

[Text] In 1955, when almost nobody knew about man-made earth satellites, the research topic "Development and Design of Facility D" was included in the annual scientific research projects plan of a certain scientific research institute. It specified substantiation of a minimum number of command and control center (KIK) telemetry stations, their siting and equipping with devices for monitoring and controlling satellites in flight.

The importance of the research topic, the large volume of theoretical and applied work involved, and the extremely limited time allocated for its execution compelled the institute administration to establish a special project team, freeing them from all other work projects. The team included specialists in exterior ballistics, radar, radiotelemetry, command systems, radio and wire communications, as well as topographers, geodesists, and construction engineers.

In July 1956 the KIK project was defended at a meeting of ranking experts from top organizations, and was subsequently ratified in directive bodies. That same month site location teams were formed of institute personnel, with the task of selecting sites for future KIK telemetry stations in specified parts of the country. By the end of 1956 sites for telemetry stations had been determined, taking into account ratified tactical-technical requirements defining the requisite conditions for operation of electronic and communications equipment, as well as the future construction of operations buildings and housing.

In the first quarter of the following year a number of construction organizations were issued instructions to build control rooms, operations buildings and housing, access rail spurs, and various service lines at the sites of future telemetry facilities. Construction of facility D was proceeding full speed ahead. In May-June teams of specialists (engineers, technicians, equipment operators) were set up at the lead scientific research institute, personnel ready and willing to relocate to a new place of

employment -- to the telemetry stations. There were enough willing volunteers to staff all KIK facilities. Around-the-clock loading of equipment, personal belongings, and other necessary items commenced in mid-July. This was an important operation, and it was overseen by institute administrator A. Sokolov and top KIK administrative official A. Vitruk.

Tests and practice drills for equipment and telemetry teams commenced at the beginning of September at nearby telemetry facilities, using a flying laboratory carrying a package of onboard equipment. As equipment was brought on-stream, these activities shifted to the more distant sites. By the end of the month all KIK facilities were ready to operate, had been tested and adjusted, and operating teams had gone through the required minimum number of training drills.

Finally 4 Oct 1957 came -- the birthday of the Soviet KIK. From this moment it commenced the continuous and difficult job of ground support of space flights.

Twenty-seven years have passed since that time. The KIK has been provided with more sophisticated electronic equipment. The great mass of diversified data is rapidly processed into the ready, finished results to which we are accustomed. Living conditions, services and amenities available to KIK personnel have also changed. Today they reside in modern housing and have the services of up-to-date children's facilities, sports stadiums, and clubhouses.

The KIK space program duty watch continues. On duty are the successors of those who hammered in the first tent pegs at the telemetry facility construction sites, those who, devoting their entire energies and without regard for their health, working in freezing cold and oppressive heat, mastering the new equipment, sprucing up and improving their residential communities.

KIK veterans stay in contact with it. They stand united behind a veterans council headed by Boris Anatol'yevich Pokrovskiy. Veterans frequently travel to their former places of employment, get together with the young specialists, and present lectures and reports. They note with satisfaction that the job they began is in reliable hands.

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SPACE PROGRAM MEDICAL RESEARCHER DESCRIBES WEIGHTLESSNESS EXPERIMENTS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 10, Oct 84 (signed to press 4 Sep 84) pp 46-47

[Article, published under the heading "History of the Space Program," by Doctor of Medical Sciences I. Kas'yan: "First Flying Laboratory"]

[Text] The unpleasant effect of weightlessness has long been known. Its effect can be diminished by creating artificial gravity. K. E. Tsiolkovskiy wrote about this subject. And we utilized his proposal in conducting our first experiments.

A centrifuge with an arm radius of 90 centimeters was installed on board a Tu-104A flying laboratory. A round glass 12-liter flask was secured to the end of the arm; white rats and white mice were placed alternately in the flask. A movie camera mounted on the hub of the centrifuge provided the capability to photograph the animals during an experiment. Centrifuge rotation and filming commenced simultaneously 2-3 seconds after onset of weightlessness and continued for a period of 25-28 seconds. A total of 40 experiments were conducted on mice and 31 on rats. Scientists studied the animals' behavior without centrifuge rotation and with creation of artificial gravity from 0.05 to 1.0 G.

It was established as a result of the experiments that the minimum effective artificial gravity is 0.28-0.3 G. In this case the animals behaved during the experiments the same as in laboratory conditions; the movements of the white rats were smooth and fully coordinated. This suggested the conclusion that the artificial gravity occurring during accelerations of 0.3 G provides an animal with the capability to spend an extended period in space. But is this magnitude sufficient to prevent the adverse effects of weightlessness during a manned mission? Of course various theories existed. Experimental data were required, however, to obtain a definitive answer. Several more years went by, and scientists suggested adopting the value of 0.277 G as the minimum effective magnitude of artificial gravity.

At that time surgery was performed on a rabbit, for the first time in the Soviet Union and perhaps in the world, in conditions of brief-duration weightlessness. G. Yaroshenko performed the surgery, and I assisted him. Yaroshenko performed several such operations. As a result the important

conclusion was reached that surgery can be performed in space, but it requires special attachments to immobilize the patient, a suction device to remove blood droplets, and surgical instrument clamps.

On one of the flights cosmonauts practiced a method of transferring from a mockup of one spacecraft to another, wearing a pressure suit and holding onto handrails. Under their pressure suits cosmonaut Ye. Khrunov and physician I. Kolosov wore masks with spinners to record pulmonary ventilation. Khrunov was to proceed in conditions of weightlessness from the mockup of one spacecraft to that of the other (safetied by snap link) and to secure a movie camera to a mount. Kolosov, as the control, was to sit motionless in a seat. When a pressure of 0.4 atm was created in the pressure suits, Kolosov rose but was unable to walk about the aircraft without assistance. At this point three persons helped him move from the forward cabin to the rear section of the aircraft and placed him in a seat.

The pilot executed two steep climbs and was about to do a third one. At this moment the following message lit up on the visual display: "Bail out!" A siren then sounded. Kolosov stood up and made his way to the door completely unassisted. After landing, when we asked where he had managed to muster so much strength and energy, he replied in embarrassment: "I was scared to death and wanted very much to live!"

In addition to cosmonauts, persons of various professions flew on board the Tu-104A flying laboratory: technicians, medical doctors, mechanicians, and scientific workers.... It was ascertained that one can conditionally identify three groups of individuals, differing from one another in behavior and subjective sensations in conditions of weightlessness.

The first group contains persons who tolerate weightlessness well, feel even better in weightlessness than on the Earth, and maintain a high level of work efficiency. Engineer B. Blinov, for example, one of the first test personnel to experience brief-duration weightlessness, stated after the flight that he had experienced a feeling of exuberance, joy, and happiness. Test pilots who flew jet aircraft reported the same feelings. The majority of cosmonauts fall within this first group. During training sessions on the Tu-104A they felt fine, correctly evaluated situation changes, and maintained precise spatial orientation ability.

Persons falling within the second group experience various discomfort in conditions of weightlessness. They have the sensation that they are in an inverted position, falling headfirst, and doing forward and backward somersaults. They have the sensation of listing to the right or left, and some experience spatial disorientation. These phenomena disappear after several flights, and the subject's feeling of physical well-being improves. Such individuals can be cosmonauts.

And finally, the third group. In conditions of weightlessness one observes that the members of this group become pale and experience dizziness and headaches; they salivate, and sometimes vomit. They experience vestibular instability and instability of the autonomic nervous system. These persons must train a great deal on aircraft, making sure that the interval between

flights does not exceed 3 or 4 months, since adaptation of the organism to the effect of weightlessness is retained for this period of time.

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